THE

UNITED SERVICE.

A MONTHLY REVIEW OF

MILITARY AND NAVAL AFFAIRS.

VOLUME III.

PHILADELPHIA, PA.:
L. R. HAMERSLY & CO.,
1510 CHESTNUT STREET.
1880.

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THE

UNITED SERVICE.

JULY 1880.

THE PURITAN MILITIA.

WHEN our forefathers landed in this country they found themselves in a boundless wilderness, the absolute architects of their destiny, with no kindred people to influence or modify their social customs. They came from a paternal government to the wild, free shores of the new continent without leaders, "save those whom God raised up as such by reason of their superior abilities." No one among them could lay claim to the prerogatives of ruler from family heritage, and, of a necessity, when this small band were called upon to settle questions of common weal, the minority acquiesced to the will of the majority. No other plan could have been possible under the circumstances, for there was not one great genius among them to assume the character of dictator. These pilgrims emigrated for a specific religious purpose, too well known for explanation here, and therefore they delegated the privilege of participation in their temporal affairs to those only who were of their sacred faith. The laws of Plymouth state that the voter, whom they called a freeman, should be of "sober and peaceable conversation, orthodox in the fundamentals of religion" (Brigham, Compact, 258). This being determined, the subsequent admissions to the franchise were conferred upon applicants by vote of those already privileged, and as full communion with the church was the provisional requirement, the result was that, as the colonies increased yearly by immigration the governing power resided in a minority of the male inhabitants, placing the larger number of men of ripe age in the condition of mere wards of the commonwealth. This disproportion was augmented by the refusal or disinclination of many of the church members to accept or claim enfranchisement, because they did not wish to hold or be eli-

gible to office. This state of affairs was of such concern to the colonies at one time that the General Court of Massachusetts made it a punishable offense to refuse or neglect the duties and privileges of the electoral right. Thomas Lechford, in a contemporaneous review of this subject of the union of church and state (Plaine Dealing, 73; Comp., 17), states that "three parts of the people of the country remaine out of the church" in Massachusetts.[1] With this preliminary glance at the lawmakers, we shall be able to comprehend more intelligently the character of the statutes they enacted for the conservation of their institutions.

As emigrants they felt no veneration and cherished no love for the establishments of the country they had left, and they chose as the fabric of their government the laws of the Mosaic dispensation rather than the contemporary laws of Old England. After making legal provision for the building up of a virtuous, intelligent, and prosperous society, they proceeded to organize a physical force to carry on their functions safe from enemies without and disturbers within. The Royal government afforded them none of the advantage of military protection, and they were not wealthy enough to maintain a standing army which could be called upon at any moment to be the advance-guard of a colonial defense. The exigencies of mutual protection and self-preservation therefore transformed this peaceful people, who came for the freedom of worship, into a military nation. Hemmed in by a savage race, whose methods of warfare were entirely novel to Europeans, they were obliged to become themselves a standing army. Besides the aborigines, who were a continual menace to the settlers, another enemy, from the North, made common cause with the Indians against the English. France, Spain, and England were the great claimants for the supremacy in the Western continent, and their complications upon the European continent were quickly reflected hither, and the colonists were kept constantly on the alert lest an invasion from Canada should sweep away their territorial possessions. These hostile influences, which were met by the settlers, necessarily involved them in continual skirmishes and battles, either with Indians or French, and oftener a combination of the two. It was a contingency that forced itself upon them, and they went about solving the problem, clumsily, it is true, for the old adage, applied to them in an altered sense, describes their condition,—necessity knows no law. In this predicament they formulated their ideas of a military system into the plan of a defensive league, where every able-bodied man should be a soldier. Their logic in relation to the need of such a system was expressed in the following simile: "For as piety cannot bee mainetained wthout church ordinances & offic^{e}s, nor iustice

[1] In Plymouth, 1643, about two hundred and thirty persons only had acquired the franchise (Plym. Rec., viii. 173). At the same date only seventeen hundred and eight persons had been invested with citizenship in Massachusetts (Mass. Rec., i. 366; ii. 291).

w^th^out lawes & magistracy, no more can o^r^ peace & safety bee p'served w^th^out military orders and offic^r^s."[2]

Every male, therefore, between the ages of sixteen and sixty, able to bear arms, should compose this provincial army; but, like every other law, this sweeping statute had its exceptions. Due deference to their social relations, with a veneration for the great and good, necessitated this clause, which exempted:

"All majestrates deputjes, offic^r^s of Court, Eld^r^s & deacons, the presedent, ffellowes, students & offic^r^s of Harvard Colledge and all proffessed schoole masters allowed by any two majestrates, the treasurer audito^r^ gene^ll^ surveyo^r^ generall of the armes &c publick notarjes, phisitions, chirurgeons allowed by two majestrates, maste^r^s of shipps and othe^r^ vessells aboue twenty tonns, mille^r^s & constant heardsmen & such other as shall by any court be dischardged eithe^r^ for bodily infirmity or othe^r^ reasonable cause." Another statute made an addition to the list in favor of "all fishermen while they are abroad during fishing seasons, ship carpenters w^ch^ follow that calling & mille^r^s." While these enactments provided for a bodily absence from the training-field, yet a spiritual presence was enjoined by the substitution of "a sufficient man in their roome to traine twice a year, according to y^e^ order," as well as the clause which declared that the favored ones "are to bee ffurnished w^th^ armes."

The unit of their military organizations was the train-band, which must be at least "to the number of sixty-fower persons" besides the officers, and could contain two hundred. Later the law was amended so that "no troop within this jurisdiction shall exceed the number of 70 listed souldiers." Should there be a larger quota of men, two bands were formed, but if any town had less than the requisite number, they were not permitted to elect a full set of officers. Concerning the election of their officers, the following statute will indicate their ideas:

"All persons of any trayned band, both freemen & others, who have taken the oath of residents, or shall take the same & being no covenant servant in household w^th^ any other, shall have their votes in nomination of those psons who are to bee appointed captaines or other inferio^r^ officers of the same band, pvided they nominate none but such as shalbe freemen: for it is the intent & order of the court that no person shall hencefourth bee chosen to any office in the comonwealth but such as is a freeman."

The officers of a full train-band were a captain, lieutenant, ensign, four sergeants, corporals, and a company clerk, who were elected in town-meetings annually by the freemen. This privilege, in 1658, was given to the companies, and obtained for many years, but in 1672 the appointing of the commissioned officers of every rank was then vested

[2] Unless otherwise indicated by reference, the extracts from the ancient laws hereafter quoted are taken from the Records of the Massachusetts Bay Colony.

in the General Court, and the officers of the bands, who ranked by the seniority of commissions, named their subordinates.

The honor of an office in the militia was much esteemed. Hon. John Hull, once treasurer of the Province of Massachusetts Bay, and a thriving merchant of Boston, who was chosen a corporal in 1648, praises God for giving him "acceptance and favor in the eyes of His people and, as a fruit thereof, advancement beyond his deserts" (Diary, Archæolog. Amer., 145). When, six years later, he was promoted to be an ensign, he recorded his prayer, "beseeching that the good Lord, who only can, would please to make me able and fit for and faithful in the place I am called unto, that I may, with a spirit of wisdom and humility, love and faithfulness, obey my superiors, so also be exemplary and faithful to my inferiors" (ibid., 147).

The train-band was composed of two kinds of soldiery, the musketeers and pikemen, the numerical proportions being by statute "two thi^rds muskets." The arms of the private soldiers were muskets and pikes, according to the division of the band in which they served. Their fire-arms are best described in the language of the regulations: "No muscquet shallbe allowed for servjce vnder bastard musket bore, & not vnde^r three foote nine inches in length, nor any peece aboue fowe^r foote three inches." These muskets could be either match-lock or fire-lock, according to the election of the soldier; in the former case the soldier had to be supplied with two fathoms of match in addition to the usual equipments. This outfit consisted of "a priming wyer, worme, & scoure^r fitted to y^e bore of his musket . . . bandleroes and rests, powder and shott" (Plym. Rec., ii. 65). This diversity in the length of the musket and the choice of match- or flint-lock must have been detrimental to a correct and uniform manipulation in drill. When we consider that no similarity in dress was enjoined, a faint idea of the heterogeneous character of this military body may be obtained. The "bandleroes" (bandoleers) were leathern belts hung around the waist, with pouches dependent for powder, bullets, and other small articles. The rests were crotched sticks for facilitating exact aim when firing. Pikemen, selected for their superior stature, were placed in the front ranks, and carried pikes, which were wooden staffs tipped with a spear-head, or more often with a mere knife or piece of a broken scythe. The pikes, "ten foot at length, at least, in y^e woode" (Conn. Rec., i. 74), answer the description of the weapon used by Cromwell's soldiers in 1650, during the civil wars, as we learn from Elton, "Complete Body of the Art Military." Besides this distinctive weapon, the law further provided "y^t those w^eh serve w^th pykes have costlets & head peeces."

The equipments and ammunition of the private soldier were furnished by himself, but the General Court found that they were not dealing with a moneyed community, and soon had to make provision for the

impecunious. In 1641 the following resolution took into consideration the state of the finances of many, "in regard that mony is now very scarce," and ordered "that ev^{r}y such pson who shall not have mony to pvide powder shalbee excuse frō the penulty if hee shall bring to the surveyar so much corne or other comodity" of equal value. "And for other defects, as the want of a bullet or 2," the soldier was doomed by a magistrate "according to the nature of the defects." The stringency of the money market in those days may be seen from an order which was passed by the court to relieve the depression of business: "Muskett bullets of a full boare shall passe currantly for a farthing a peece, provided that noe man be compelled to take above xij^{d} att a tyme." The pikemen, too, were afforded relief in an enactment which ordered that a "buffe coate or quilted coate" should be used in consideration of the fact "that corslets are wanting to many souldyers."[3]

The militia officers were privileged characters in all the walks of life, and at a time when the colonists were given to the vanities of extravagant apparel they and their families were declared to be exempted from the laws which were directed against excess in dress. The General Court, in their cumbersome phraseology, concluded that it was necessary for them to appear in fine clothes on account of their exalted station. On duty the commissioned officers carried swords or partisans (commanders leading staff), and, if they desired, could have a pistol besides. The sergeants bore halberds, which were a modified legacy of the weapon of that name in use during the middle ages. At first the captains were maintained by the train-bands, then the general government attempted it, but later the charge was referred back to the several organizations. This maintenance we conclude to be the supply of arms, uniform, and pay to which they were entitled while on duty. Their commissions were issued by the General Court "in parchment fayrly writen," which reached them after a long process of circumnavigation from grade to grade. All the officers were obliged to take special "oathes suitable to thei^{r} places," the tenor of which was a fidelity to the government.

The aggregation of these town organizations formed regiments, which were artificially divided by the shire-lines of the colony. The officers of each county regiment were a lieutenant and sergeant-major, annually elected by the freemen at the town-meetings. The sergeant-major, who was a species of muster-master, was enjoined, "once ev^{r}y yeare at least . . . to drawe fourth his regiment . . . & y^{r} to put ev^{r}y cap^{t} & offic^{r}s of ye companies in y^{ir} places and to instruct y^{m} in y^{ir} du-

[3] The prices of arms and equipments varied considerably, according to quality. In 1633 corselet and pike were rated at one pound ten shillings (Plym. Rec.), and in 1690 a gun was worth one pound. This was old tenor, and cannot be accurately computed now, although in general terms it may be stated to be of greater value than our present currency.

ties, according to y^e^ rules of military discipline & to ex^r^cise his regim^t^ whether it shall consist of horse pikes or musketers according to his best skill & abilities, as if he were to leade y^m^ forth against an ennemi." The several regiments were under command of the sergeant-major-general, an officer inferior only to the governor, who in turn was "to be gene^r^all of all the military forces" in times of peace. In case of war, a special commander was appointed by the General Court. The regimental officers, from governor down to sergeant, were obliged to meet semi-annually "to consult of such matters as tend to the safety of that sheire," and "to take notice of all millitary affaires." Besides the usual commissioned officers, the spiritual welfare of the troops was not overlooked, and the General Court, mindful of its duty, incorporated this clause in their laws relating to the regiments: "And for the chaplaines . . . to the severall companies the severall townes shall make choice of some principall man or two or three in each town & psent them to the counsell who shall appoint one of them to the office in each company."

With the paraphernalia of the regiments, who only met once a year, and later once in three years, we shall not meddle. The key to the whole system can be studied in the train-band, and to them we shall revert after a brief note upon the numerical strength of the militia. In 1644, just after the colonial confederation, the population of Massachusetts Bay was fifteen thousand; Plymouth, three thousand; Connecticut, three thousand; and New Haven, two thousand five hundred (Palfrey, ii. 5). At the same date in Massachusetts there were twenty-six train-bands, and there had been "of late a very gallant horse troop listed" (Johnson, "Wonder-Working Providence," 190).[4] Twenty years later the General Court state, in answer to the Royal commissioners, that "our militia is ordered into three regiments of foote besides some supernumary companjes vnder three majo^rs^ & one majo^r^ generall, together withour troopes, consisting of about fower thousand ffoote & ffower hundred horse."

For the proper discipline and exercise of the militia, the eager lawmakers, who were themselves exempt from training in the ranks, ordered, in 1631, "that euy captaine shall traine his companie on Saterday in euerie weeke . . . the traineing to begin att one of the clocke of the afternoone." As may be supposed, this regulation was altogether too burdensome; so the next year they reduced it to "but once a monethe," excepting July and August. This was found too much of a task for a people who were busy making new homes, and it was reduced to eight times a year " . . . what dayes & tymes they shall find to bee most fit for avoyding of losse of tyme & the oportunities of the furtherance of husbandry & other busines of the country." After

[4] The number of males of the military age in Plymouth, in August, 1643, was six hundred and twenty-seven (Plym. Rec., viii. 187–197). As before noted, but two hundred and thirty were freemen.

various compromises, all tending toward a reduction of the number of days, the court, in 1679, declared that "for the easement of the country the ordinary traynings of foote & horse are reduced to fower dayes in the yeare, any law vsage or custome to the contrary notwthstanding."

We now come to the great Puritan holiday, when the stern and dignified pilgrim unbent his rigid mien and sated his natural desire for display in the glories of Training Day. Here, gathered upon the town common, was the yeomanry of the village, with polished fire-arm, glittering corselets, and savage halberds. What a sight to thrill the incarcerated sensibilities of the fair maidens of that extremely proper century, when "light conversation" between the sexes was prohibited by statute!

The legal summons upon training-days was "a beacon fired & 4 muskets discharged & a drum beaten at w^{ch} every man shall repaire to his colo^{r}s or appointed meeting place to attend further order." The troops being assembled, the training was opened with prayer (Plymouth Rec., ii. 61), which was the custom at Plymouth, and it is probable that this routine was the same in the other colonies. The clerk of the band then called the roll and inspected, and reported to the captain upon the condition of the arms and ammunition, ascertaining if each soldier had "one pound of powder 20 bullets & 2 fathome of match wth musket, swords, bandilers & rest, upon y^{e} poenalty of 10s for ev^{r}y defect." If any soldier was absent, the clerk reported such absence at the headquarters, when the delinquent person was subjected to the provisions of this rule:

"It is ordered that if any trained soldier shalbe absent from traineing vpon their traineing dayes, haueing lawfull warneing, shall forfect V^{s} & that it shalbe lawful for one of the s^{r}ieants appoyncted by the cap^{t} of the company to levye: vnless wthin 2 dayes after it be demaunded, the pty offending bring a certificate from the nexte Assistant that hee had a necessary occacon to be absent."

These and all other fines for delinquencies were applied "eith^{r} in ensigne, drum, holberds, candle or wood for their co^{r}t of guard, or to pvide powder or armes for y^{e} porer sort."

These little duties and delays being over, the morning review was held, and the train-band went through the excitements of the sham fight and such other manœuvres which were calculated to make them experts in the art of war. This mock battle was one of the features of the train, and was productive of great personal prowess and regimental glory. Old Judge Sewall (Diary, Mass. Hist. Coll., vol. v. 100), the veriest gossip in Boston, and a transplanted Pepys, writes thus in 1685 of the "Training of six companies. Exercise was Taking of the Fort and advancing white Colours with Red Cross above the Red Colours: so it stood while went to Dinner. Then Retaken." Evidently sound in hygienic laws as in the mystical theology of the Trinity were they,

for the pangs of hunger were superior to the heroic calls from superior officers. For a time there was no music but the drum, each company having two, the drummers being compelled to serve under a penalty. Gradually this monotonous tattoo was supplemented by the fife and bugle, innovations which shocked the godly people as the church-organ and furnaces did in later years.

Of the manual of arms we know but little, and that would be impossible to explain, except at length, without the aid of illustrations. It will be sufficient to state that the arms were carried in the left hand, and the manual of firing was complicated by the use of the flint and match. To be certain, however, of their intentions about drill, they recorded their opinions as to the propriety of a strict adherence to the code of tactics. Therefore it was thought necessary to state "that all postures of pike and muskett, motions, ranks and files, &c., messengers, skirmishes, seiges, batteries, watches sentinells &c. bee always p'formed according to true millitary discipline."

The noon rest was occupied in the mess, and with such diversions as the enterprising peddlers always brought there to attract and amuse. The venders of small wares, cakes, and milk were there in full force, and with them the dealer in ardent spirits, whose straight whisky made the bibulous private walk crooked. This gradually became a source of trouble, and the General Court, "because of late there hath been toe much d^{r}unckeness," ordered that if any person came to the training-field to sell "wine, strong liquo^{r}s, cider and other inebriating drincks" without a license, their stock in trade should be seized. If the soldier should attempt to pass away the hour with bird or game shooting, he would be informed "that noe trayned soldier shall make any shott vpon any traineing day, but with bullets att a mke by direccon of the captaines vnder the penalty of xij^{d} for eury such shott." If he were given to the pleasures of the games of chance, and should be lured into gambling, using his equipments for stakes, the clerk of the band would report such fact to the captain, who would then proceed under this clause: "If any shall . . . sinfully play away theire armes at dice or cards . . . they shall be kept as pyone^{r}s or scavingers till they furnish themselves with as good armes."

In the afternoon the same routine was performed as in the morning, and the great day closed with prayer (Plym. Rec., ii. 61), after which time it was enacted that "all trayned souldjers whether horse or ffoote, shall repaire to theire seuerall quarters & lodge theire armes imediately afte^{r} theire dismission vpon trayning dayes, & whosoeuer shall either singly or in companyes remayne in armes & vaynely expend theire time & powder by inordinate shooting in the day or night" should be subject to a court-martial. We really can know more about the things which they could not do than their actual duties upon training-day, because the regulations are devoted mostly to a description of the penal offenses.

The laws of the courts-martial were strict, and included capital punishment for desertion, seditious language, insult to superior officers, rape, adultery, and unnatural abuses. The lighter offenses of theft, fornication, concealed knowledge of crime, were treated to some "grievous punishment," which was defined as "casheiring, the strappadoe or riding the wooden horse to fetch blood." The strappado was a machine constructed for drawing the offender to the top of a beam and letting him fall, ostensibly to dislocate a limb, and the bilbo was a kind of stock or shackle. They provided also for military honors when a companion in arms died, and the laws of Plymouth (Winsor, 91) state that upon the death of any member "y^e^ company upon warneing shall come together w^th^ their armes and interr his corps as a souldier and according to his place and quallytye." This was the only ceremony the pilgrims would permit at a burial. With their intense hatred of the Established Church and its forms of worship, they were over-zealous in an opposite extreme, and not even a prayer was offered at the cheerless entombment of friend and kindred.

Nor did the military spirit neglect the rising generations, who were mute but admiring spectators at these martial festivities, for they provided the young with a cadet service having all the necessary attention paid to drill and equipment. These logical pilgrims, who always had a habit of apologizing for every law they made, thus expounded their ideas: "Whereas it is conceived y^t^ y^e^ training up of youth to ye art & practice of armes wilbe of great use in y^e^ country in divers respects & amonge y^e^ rest y^t^ y^e^ use of bowes & arrowes . . . all youth . . . from ten yeares ould to y^e^ age of sixeteen yeares shall be instructed . . . in y^e^ exercise of armes as small guns, halfe pikes, bowes & arrowes," and "in every company some vnde^r^ office^r^ shall be appointed by the cheife comand^r^ to exercise such children as by their paren^ts^ or maste^rs^ allowance shall resort to the traynings."

In addition to the work of the train-band service, the towns had military watches, an officer akin to the modern metropolitan police, and the citizen-soldiers took turns in occupying these posts. The watches, which were more for protection from the Indians than from civilized enemies, were kept from "halfe howe^r^ after sunset to halfe an howe^r^ before sunn rising." The court thought it best that the watches "should stand double, a pike & a musketere togethe^r^," and "if y^e^ sentinell or watch shall meete w^th^ such as shall pve too strong for y^m^," or in any way "put y^m^ to fear . . . they shall charge their pike & discharge their musket upon y^m^ & returne w^th^ speede to their co^r^t of guard & raise an alarum." It would hardly be thought necessary to define an alarm, but the specific deputies to the General Court described the proper one to be "the distinct dischardge of 3 muskets or the continued beate of y^e^ drum or y^e^ fyring of a beacon, or discharge of a peece of ordinance or any one of these in the night . . . which each sentinell

shall answer by going to the houses in his quarte's & crying Arme, arme."

These citations from the old colonial militia laws are but a tithe of the whole, but are just enough to give us a satisfactory glance at their soldiery. As the settlements grew, and the temperament of the original colonists was modified by various factors, they found it necessary to tinker and patch the early statutes many times to meet new circumstances. Revisions of the entire code are numerous, and each successive draft became more elaborate than its predecessor. Thus it was that the peaceful pilgrim, who came to these shores for the liberty of conscience and freedom of worship, became a man of arms, and thus his children grew up to learn the strategy of offensive and defensive warfare. But as time passed away the necessity for continual apprehension of the savages and their allies grew less as the colonies increased in population and the peace in Europe was settled. In a hundred years after the first settlements in the Bay Colony the paraphernalia of this cumbersome system fell into disuse. The settlers were sated with the pomp and circumstance of war. Yet the training-day lingered in the affections of the people for more than two centuries, and many of our older citizens of the New England States can recall the dying brilliancy of the general muster of the militia. The compulsory train-bands had perished by default, and the volunteer rifle corps, taking their places, merged the "fowr dayes eury yeare" into one grand encampment and muster of the heroic spirits of the time. Oh, the glory and the gusto that were crammed into the fleeting moments of those grand old days, when it seemed as if the united armies of the world would be decimated before the swelling ranks of our bold and high-stepping grandfathers!

This embryo militia system, which has a humorous tinge to this generation of readers, became the foundation of our strength in the Revolutionary war, and was the fountain-source of that dauntless spirit which developed so grandly in the late test of our nation's prowess. Then the peaceful citizen suddenly became a man of might, and the transformation was as natural as the change from youth to manhood.

CHARLES EDWARD BANKS, M.D.

ADMIRAL DAVID GLASGOW FARRAGUT.[1]

THE opening sentence of the preface of the work herein reviewed states that "it was the express wish of Admiral Farragut that his biography should be written by his only son." The biography, as written, may therefore be accepted as "official" and authentic in its statement of facts, and being so, will be closely followed in this review of the dead hero's life.

David Glasgow Farragut was born at Campbell's Station, near Knoxville, Tennessee, on the 5th of July, 1801. His father, George Farragut, who was born in the island of Minorca in 1755, and arrived in America in 1776, was descended from one of the oldest and most illustrious families of the little kingdom of Majorca, and upon his arrival in this country immediately espoused the cause of the colonists, and fought in the Revolutionary war, as also in the war of 1812. David's mother, Elizabeth Shine, was born in Dobbs County, North Carolina, in 1765. In 1802 or 1803, Major George Farragut moved to Louisiana, and was soon afterwards appointed a Sailing-Master in the navy. He was on duty at the New Orleans naval station with Sailing-Master David Porter (father of Commodore Porter of "Essex" fame), when the latter was taken seriously ill. Farragut had Porter brought to his house, where he died, in 1808, Mrs. Farragut's death, from yellow fever, occurring at the same time. Sailing-Master Farragut died in 1817.

Shortly after Sailing-Master Porter's death, Commander David Porter took command of the naval station at New Orleans, and having heard that his father had received much attention from the Farraguts, and had died at their house, he visited them and proposed to adopt such one of the children (there were three boys and two girls) as would go with him. David promptly said that he would go, being inspired, as he afterwards wrote, "by his uniform and that of my brother William, who had received an appointment in the navy some time before." He accompanied Commander Porter on the latter's return to Washington soon afterwards, and through the instrumentality of his kind patron obtained a midshipman's warrant, dated December 17, 1810, being then

[1] THE LIFE OF DAVID GLASGOW FARRAGUT, FIRST ADMIRAL OF THE UNITED STATES NAVY; embodying his Journal and Letters. By his son, Loyall Farragut. New York: D. Appleton & Co.

only a little over nine years and five months old, and being one of the youngest midshipmen ever appointed in our navy. It will thus be seen that he had the double advantage of beginning his naval career at an exceptionally early age, and under the most favorable auspices.

In August, 1811, Captain Porter was ordered to the command of the "Essex," thirty-two guns, taking with him his young charge, who had been attending school in the mean time. However interesting it might be to do so, space forbids dwelling upon the eventful cruise of the "Essex," and her ultimate loss in an engagement with the British ships "Phœbe" and "Cherub" off Valparaiso on the 28th of March, 1814. Suffice it to say that it was a cruise as exciting as it was in every respect instructive to our embryo admiral,—a varied experience which was of incalculable value to him through his whole after-life. It would be easy to moralize on the influence which the incidents of his life on the "Essex"—no other vessel then afloat afforded equal professional advantages to young officers—had in moulding the character of Farragut; the beneficial nature of that influence is so obvious in the light of his subsequent career, that we may almost question whether he would ever have become the first admiral of our navy if he had not had the "Essex" for his naval school and Porter for his professional teacher.

Of his life with Commodore Porter it is but proper to say a few words here. During the five years that he was under the personal supervision of his patron, their relations were always of the kindliest, not to say most affectionate, nature, as were those existing between him and Mrs. Porter. The commodore was little less than a father to him, sending him to school during the intervals of duty or leave on shore, instructing him carefully in his duties on board ship, and evincing a truly paternal interest in him at all times. That this attention and solicitude were duly appreciated and acknowledged, is evident from the following note in Farragut's diary: "I am happy to have it in my power to say, with feelings of the warmest gratitude, that he (Porter) ever was to me all that he promised, my 'friend and guardian.'"

After serving for short periods on the "Spark," "Independence," and "Macedonia," Farragut was ordered to the "Washington," which was bound for the Mediterranean. His diary of this cruise shows it to have been a most interesting one to him, and one from which he obtained the greatest possible advantage by his close observation of the many places and peoples seen. That he had even at that early age given evidence of the possession of those sterling qualities which afterwards made him famous, is manifest from the fact that, upon the appointment, in 1817, of Mr. Charles Folsom, chaplain of the "Washington," as United States consul at Tunis, that gentleman wrote to Commodore Chauncey, commanding the squadron, asking that "Midshipman Farragut may be permitted to reside with me during the winter at Tunis, and pursue his education under my care;" adding,

"He has acquired a sense of character and a manly tone of thinking from which the best results are to be expected." A compliment, and high praise, indeed, for a youngster.

The permission desired was readily granted, and Farragut immediately left for Tunis with Mr. Folsom, with whom he remained nine months, engaged in assiduous study. During a journey into the interior, made in company with Mr. Folsom and the French and Danish consuls, he received a sun-stroke, the effect of which was a weakness of the eyes that troubled him all through after-life. At the close of the year 1818 he reported for duty again on the "Franklin," and the following year received his first promotion,—being appointed acting lieutenant on the brig "Shark."

From 1819 to 1861, forty-two years, is a period in our subject's career which must be hurried over briefly here in order to give proper notice to the more important events which followed the latter date. Not that his life in the interval was uneventful or uninteresting; it was not; but those who desire the details of it should read his "Life" in full. It is a story which will well repay its perusal.

That his official pathway during the period named was not altogether a flowery one may be inferred from his statement that "I had always to contend with the burden first imposed on me by Commodore Porter's saying that I 'was too young for promotion.' Although that remark was made just after the action of the 'Essex,' I never appeared to get any older in the eyes of the government or my commander, and consequently had to contend inch by inch, as opportunities presented, with men of riper age and apparently more entitled to the places sought." On the 24th of September, 1823, he married Susan C., third daughter of Jordan and Fanny Marchant, of Norfolk, Virginia. This lady soon became a confirmed invalid, and, after a married life of almost continuous suffering, died in December, 1840. Farragut's devotion and attentions to his invalid wife were so marked and constant as to cause a lady to say, "When Captain Farragut dies, he should have a monument reaching to the skies, made by every wife in the city contributing a stone to it." No nobler eulogy was ever passed upon a noble life. On the 26th of December, 1843, he married Virginia, eldest daughter of William Loyall, Esq., also of Norfolk, by whom he had one son, and both of whom still survive him. The chief incidents of his official life between the years previously named were his cruise in the West Indies against the pirates, in 1823; his services on the east coast of South America during the Argentine revolution, in 1829; on the coast of Mexico during the war between that country and France, in 1838, and again in 1847, during our own Mexican war; and finally his establishing the new navy-yard on the Pacific coast at Mare Island, where he remained from 1854 till 1858, superintending the laying out of the yard and the construction of the buildings.

The opening of the year 1861 found Captain Farragut "waiting orders" at his home in Norfolk, Virginia. The secession movement was rapidly approaching its crisis, and nowhere was it more warmly discussed than in Norfolk, the society of which was largely naval, owing to the number of officers resident or on duty at the navy-yard there. Farragut's position was a delicate one, and he felt it keenly. Southern by birth, by residence, and by family and marriage connections, his personal sympathies were naturally influenced by these powerful considerations, and he sadly exclaimed, "God forbid that I should have to raise my hand against the South!" But he felt at the same time that he had a higher duty to perform than the indulgence of purely personal sympathies. His son, in writing of his action at this critical period, says, "He felt that he owed his first allegiance to the United States government, which had given him his professional education, employment, and rank. He had strong hopes—judging from the patriotic sentiments of various speeches in the convention—that Virginia would not join in the attempt at secession; and when her action was precipitated by the excitement that followed the attack on Fort Sumter and President Lincoln's call for troops, he did not believe it was in accordance with the will of a majority of her people. He felt, as he expressed it, that 'the State had been dragooned out.'"

On the 18th of April public announcement was made that Virginia had passed the ordinance of secession. The time for Farragut to decide upon his course, once for all, had now come. Which should he obey, the cry of sympathy or duty,—the call of his State or his Nation? Results more mighty than either he or the country even dreamed of depended upon his decision,—which, it is but justice to say, was taken instantly. It was to follow the old flag which he had followed so faithfully for fifty years. Announcing his purpose to his wife, he said, "This act of mine may cause years of separation from your family; so you must decide quickly whether you will go North or remain here." Like a true wife, she at once decided to go with her husband, and in a few hours afterwards they and their son left by steamer for the North, —in the service of which he was so soon to become its most conspicuous naval commander.

He secured a cottage in the village of Hastings-on-the-Hudson, and there impatiently waited to be called into active service. Having cast his fortunes with the North, or, rather, with the national government, he was not content to be a passive observer of the dread tragedy then beginning, as many in his position would prefer to be.

The summer of 1861 was rather a disastrous one to the Federal armies, which suffered several serious reverses, owing to causes not necessary to specify here. The North naturally became alarmed, and loudly demanded more energetic and successful management in the conduct of the war ere its moral and material losses became too serious

to retrieve. As the first step in the new plan of campaign adopted at this juncture, it was decided to obtain possession of the Mississippi River, which, from Memphis to the Gulf, was then controlled by the Confederates, and which was the highway along which, or across which, they transported immense supplies from the Southwest to the seat of war. To accomplish this object a large fleet was to be organized and sent to the mouth of the Mississippi, as that river could be taken and held only by a naval force. To find a suitable commander for the fleet was the next consideration. Of the many officers suggested for the position Farragut was at last chosen,—a grand tribute to his qualities as an officer and a patriot, showing that the authorities in Washington believed that these qualities far outweighed any doubts they might have entertained concerning his loyalty.

Although chosen for the command of the Western Gulf Blockading Squadron in December, 1861, it was not until January 20, 1862, that he received his final orders, and not until February 2 that he sailed from Hampton Roads in the steam-sloop "Hartford" for his station. The "Hartford," which is still famous on account of having been his flag-ship through the remainder of the war, was then one of the finest vessels in the navy; she was a screw-ship of the second class, and of nineteen hundred tons burden; two hundred and twenty-five feet long, forty-four feet beam, and sixteen feet three inches mean draught with everything in. Her battery consisted of twenty-two 9-inch Dahlgrens, two 20-pounder Parrotts, and, afterwards, a rifled Sawyer gun on the forecastle.

Farragut's orders were, briefly, to proceed up the Mississippi, reduce the various fortifications along the river, capture New Orleans, and then send a sufficient force farther up to co-operate with the naval expedition going down from Cairo, thus obtaining unobstructed possession of the whole river, which would be as great an advantage to the Federals as it would be a disadvantage to the Confederates. For this purpose he had a force which, at the capture of New Orleans, numbered two frigates, seven sloops-of-war, fourteen gunboats, twenty-one mortar-schooners, and three other vessels. In addition to their fortifications, the Confederates had a fleet of fifteen vessels in the river, including one iron-clad and a powerful floating-battery.

The vessels of the fleet were slow in coming in, so that it was the middle of April before the last of them had arrived, and before Farragut was able to make his final arrangements for the intended movement. This movement was one of the boldest in conception which had ever been attempted in naval warfare, and the responsibility resting upon the officer in command was, therefore, of a peculiarly grave character. First in the list of obstructions to be passed by the attacking fleet was a row of eight dismasted vessels anchored across the river, about thirty miles above its mouth, these hulks supporting two chain cables stretched

from side to side. Just above this barrier, on the west bank, was Fort Jackson, mounting, with its water-battery, seventy-five guns, and a little above that, on the east bank, Fort St. Philip, mounting forty guns. Above these the rebel fleet lay, ready to fall upon any vessel that might, perchance, get that far undestroyed. When to all these is added the certainty that fire-rafts would be sent down with the strong current among the attacking vessels, which would find it difficult to manœuvre out of their way in the crowded river, it will be seen that the proposed attempt was extremely hazardous, if not utterly hopeless,—so much so, indeed, that many of the ships' commanders were strenuously opposed to it.

The attack was opened on the 18th by the mortar-boats, which, for six days and nights, continuously poured in a tremendous fire upon the forts from a distance of about three thousand yards, without, however, doing any great damage. On the night of the 20th, Fleet-Captain Bell was sent with two steamers to cut a passage for the fleet through the chain obstructions, which mission was successfully accomplished in the face of a heavy fire from the enemy. At two o'clock on the morning of April 24 the order was signaled from the flag-ship for the fleet to weigh anchor and advance in the order of battle previously prescribed for them. The details of the passage through the barrier, past the thundering forts, and up the river to where the rebel fleet lay, are matters of familiar history. The battle has been summarized in the following concise terms: "Thus was accomplished a feat in naval warfare which had no precedent, and which is still without a parallel, except the one furnished by Farragut himself, two years later, at Mobile. Starting with seventeen wooden vessels, he had passed with all but three of them against the swift current of a river but half a mile wide, between two powerful earth-works which had long been prepared for him, his course impeded by blazing rafts, and immediately thereafter had met the enemy's fleet of fifteen vessels, two of them ironclad, and either captured or destroyed every one of them. And all this with the loss of but one ship from his own squadron. Probably few naval men would have believed that this work could have been done so effectually, even with ironclads." It is needless to add that this was the most remarkable battle in its character and results ever fought, and that the man who planned it and carried it to a conclusion successful beyond the most sanguine anticipations, was justly entitled to the eulogies which were showered upon him from all sides when the nature and importance of the affair—at first unknown or under-estimated—were fully published to the world.

On the 25th the fleet ascended the river, silencing the various batteries along the banks, and before noon was before the city of New Orleans, which, having no works to oppose resistance, quietly surrendered, the Confederate troops withdrawing. It was occupied a few

days afterwards by a Federal army under General Butler, who assumed military command of the city. Thus fell the largest, richest, and most important city in the Confederacy, never again to pass out of Federal possession,—a result due wholly to the brilliant services of the navy. In return for his successes, Farragut appointed eleven o'clock on the morning of the 26th as the hour "for all the officers and crews of the fleet to return thanks to Almighty God for his great goodness and mercy in permitting us to pass through the events of the last two days with so little loss of life and blood."

The next few weeks were occupied by the fleet in repairing damages, laying in stores, and patroling the river up to within a few miles of Vicksburg, silencing old batteries and preventing the erection of new ones. The city named, guarded on each side by powerful fortifications, was still held by the Confederates, however,—it being, in fact, one of the very few points on the river which they then held,—and until that was taken the Mississippi would not be in complete possession of the Federals, which was the great object to be accomplished by the campaign. The chief difficulty which Farragut had to contend against, and one which he frequently complained of, was that the vessels of his fleet, being sea-going ships, were not adapted to the service the government required of them,—duty in a narrow, shallow river, in which they could not be conveniently manœuvred, and in which they were constantly running aground, frequently causing much delay and great loss. Successful as he was with the force at his command, there is no doubt that he would have been more so had he vessels suited to the peculiar nature of river service. It was with some little reluctance, therefore, that he undertook to obey the Department's peremptory order to "clear the river through," fearing that the river was not high enough to float his ships past the Vicksburg batteries and enable him to effect a junction with Flag-Officer Davis's fleet, which was above the city. He determined to do his best, however, and on the 25th of June issued his order prescribing the plan of attack to the fleet. At two o'clock on the morning of the 28th the fleet got under way, and at four o'clock the first shot was fired. The rebel batteries were on the bluffs, at a considerable elevation above the river, and as gun after gun opened fire on the passing vessels the ridge of the bluffs appeared to be one continuous sheet of flame. All the vessels of the fleet (except three, which remained below) passed the fortifications and city, the casualties on board being very few and the injury to the ships trifling. A few days afterwards Davis's fleet, descending, joined Farragut, who was then enabled to announce the successful execution of his orders. In his official report upon this occasion he wrote: "The Department will perceive from this (my) report that the forts can be *passed*, and *we have done it*, and can *do it again as often as may be required of us*. It will not, however, be an easy matter for us to do more than silence the batteries for a

time, as long as the enemy has a large force behind the hills to prevent our landing and holding the place."

The next affair of importance in which Farragut again distinguished himself was the passage of the batteries at Port Hudson, on the night of March 14, 1863, in co-operation with the army under General Banks, who made the attack from the land side. This battle, which was somewhat similar to that at Vicksburg, was but measurably successful, owing to more serious accidents and losses to the fleet. After this he remained between the Red River and Vicksburg, co-operating with Admiral Porter above the former place and with General Grant at the latter, until the early part of May, when he returned to New Orleans to look after his squadron there. On the 4th of July, Vicksburg surrendered, followed soon after by Port Hudson, thus giving to the Federals unobstructed passage of the whole river. Feeling that he could then consistently take the rest which the successful completion of his duty entitled him to, and which his failing health demanded, Farragut turned over the command of the Mississippi River to Admiral D. D. Porter about the 1st of August, and sailed in the "Hartford" for New York. During his few months' stay in the North he was the object of the most enthusiastic receptions by citizens and corporations, who felt that they were honoring themselves in thus honoring him.

Early in January, 1864, Farragut again hoisted his flag on the "Hartford," and sailed for the Gulf. For some months after his arrival there he was kept busy with the ordinary, though responsible, duties of the blockade, after which followed the preparations for the attack on Mobile Bay. This bay was defended by three forts,—Morgan, Gaines, and Powell,—one ironclad, and three gunboats, and innumerable piles and torpedoes to obstruct the several channels. Like the passage of Forts Jackson and St. Philip, the battle of Mobile Bay, which took place on the 5th of August, must be read in detail to obtain an adequate conception of its character and importance. Suffice it here to say that, great as were the obstacles to be overcome, and brilliant as was the success in the former case, it is generally conceded that the obstacles and success in the latter case were even greater and more brilliant. This battle, which, as Farragut himself afterwards wrote, "was the most desperate battle I ever fought since the days of the old 'Essex,'" was the crowning achievement of his career. It trumpeted his name to the world as the greatest naval commander of our age, if not of any age, and the notices of it exhausted the vocabulary of praise which he received abroad as well as at home.

It was in this battle that two incidents occurred which are frequently quoted, and as their authenticity is often questioned, the facts are here stated on what may be considered "authority." When the fleet were entering the bay, Admiral Farragut stood in the port main-rigging of the "Hartford," a few ratlins up. As the smoke of battle increased

and obscured his view, he ascended the rigging, step by step, until he found himself partly above the futtock-bands, and holding on to the futtock-shrouds. Captain Drayton noticed his position, and, fearing that some shock might precipitate him into the sea, ordered one of the crew to take up a line and make his position more secure. The man in narrating what he did, said, "I went up with a piece of lead-line, and made it fast to one of the forward shrouds, and then took it round the admiral to the after-shroud, making it fast there. The admiral said, 'Never mind; I am all right;' but I went ahead, and obeyed orders." This was the famous occasion of Farragut's "lashing himself to the shrouds." The other incident was as follows: while the fleet were passing the forts, in the midst of a terrific fire, the "Brooklyn," which was leading, suddenly stopped and began to back. The other vessels, crowding on behind, were thrown into confusion, which threatened destruction to all. The "Hartford" was next to the "Brooklyn," and Farragut, still in the shrouds, shouted through his trumpet to Captain Alden, "What's the trouble?" "Torpedoes!" was the reply. "Damn the torpedoes!" said Farragut; "four bells, Captain Drayton; go ahead! Jouett, full speed!" The "Hartford" at once passed the "Brooklyn," took the head of the line, which soon reformed, and led the fleet to a glorious victory. The best, because a thoroughly impartial, comment upon Farragut's prompt and daring action at that critical moment, is to be found in a report of the battle by Rear-Admiral Hamilton, of the British navy: "It appears to me that a disastrous defeat was converted into victory by (in so unexpected a contingency) the quickness of eye and power of rapid decision Farragut possessed, which saw at a glance the only escape from the dilemma the fleet were placed in, and which can only be acquired by a thorough practical knowledge in the management of fleets, and for want of which no amount of theoretical knowledge, however desirable in many respects, can make up in the moment of difficulty."

Soon after the battle of Mobile Bay, Farragut was complimented by being solicited by a number of prominent politicians to permit his name to be used as a candidate for the Presidency in the election then approaching. He declined the honor, however, saying, "I have no ambition for anything but what I am,—an admiral."

His health again beginning to suffer in consequence of the severe mental and physical strain to which he was constantly subjected, the Department ordered him home about the end of November. His reception in the various cities of the North was a repetition, but on a grander scale, of the one he received the year before. The people seemed to think that they could not do too much for one to whom they felt they owed so much. The war terminating in April, 1865, he did not return again to the Gulf.

July 25, 1866, Congress passed a law creating the grade of Admiral,

which had never before existed in our navy, and the rank was immediately conferred upon Farragut. In 1867 he was appointed to the command of the European fleet, and sailed from New York in the frigate "Franklin," on the 28th of June, his wife being permitted to accompany him on board. During his European cruise of sixteen months he was the recipient of a series of public ovations and private marks of distinction such as no American had ever before received, and which have been paralleled since only by those of which General Grant was recently the object.

In the summer of 1869 he visited the Pacific coast, his wife again accompanying him. His reception there was of the most enthusiastic character. While returning from California he was suddenly taken ill of heart disease in Chicago, but, though his life was despaired of for some days, he slowly recovered, although he never again enjoyed perfect health. While on a visit, with his family, to Portsmouth, New Hampshire, the guest of the late Rear-Admiral A. M. Pennock, who was in command of the navy-yard there, his rapidly-failing health reached its climax. He died peacefully at the commandant's house on the 14th of August, 1870, at the age of sixty-nine. The remains were conveyed to New York, where they were taken in charge by the city authorities, who, on the 30th of September, gave an imposing public funeral, the day being marked by a general suspension of business out of respect to the memory of the dead hero, whom not the city alone, but the whole country, sincerely mourned. The remains were interred in Woodlawn Cemetery, Westchester County.

The highest panegyric upon Admiral Farragut's life is to be found, not in the fulsome eulogies of admiring friends, whose opinions, however sincere, are apt to be influenced by purely personal considerations, but in a truthful record of his career, which alone can give us a faithful reflex of the works and character of the man. From such a record we would learn that the acknowledged purity and nobility of his character were not, as is frequently the case with men, the tardy acquirements of his mature years, but were quite as distinctive in early life, attracting, even in boyhood, the attention of all around him. From it we would learn that his career through the civil war was not accidental or phenomenal, the result of "luck" in his first selection for command; his whole life, from his first service and battle on the "Essex," had been a practical training for the gigantic task which Providence had in store for him to perform, and it is safe to say that if he had not been appointed to command the operations on the Mississippi, he would soon have equally distinguished himself in other positions, and have ultimately attained the rank which he was destined to occupy. He was not the "creature of circumstances"; no man was ever less so; he was master of them. His naval life was a continued struggle to obtain official recognition of his rights and professional qualities. As previ-

ously shown, even his guardian and best friend, Commodore Porter, looked upon him as being "too young for promotion," and treated him accordingly, and throughout his career there were many instances, of which he complained, in which his just claims were overlooked or denied. It will thus be seen that he obtained his ultimate commanding position not through a caprice of fortune or the influence of powerful friends, but solely through his own personal and professional merits.

It is scarcely necessary to affirm, what no one is bold enough to question, that Farragut was a commander of the first rank. In boldness of conception, thoroughness of plans, and success of execution he was not surpassed by any admiral who ever led a fleet to battle. Nor were his victories the result of weakness on the part of his enemies or of overwhelming advantages in his own favor. On the contrary, it might be said that at New Orleans, Vicksburg, Port Hudson, and Mobile Bay the odds of battle were all against him, and would have been sufficient to defeat most commanders, if not to deter them altogether from facing them. In these cases it was not "luck" that aided him; still less was it superior force. It was simply genius in planning his attacks, and inspiration in taking advantage of every incident of battle to snatch victory from threatening defeat. In him were combined in a pre-eminent degree quickness of perception, which enabled him to take in at a glance all the strong and weak points of his own and his opponent's position; correctness of judgment, whether upon ordinary duties of service or in forming plans of battle; promptness of action in meeting unexpected emergencies, which would have paralyzed other minds; and excess of personal courage, always leading where he would have others follow, and frequently exposing himself to imminent dangers. In his death his country lost the greatest of her many great naval commanders, and the world lost one of the most brilliant stars in the galaxy of its immortal names.

It cannot be said that Farragut had no enemies. To claim it would be a questionable compliment to him, because no man occupying a position of command over thousands of his fellow-men can escape giving offense to some of them in the faithful discharge of his duty. In every large body of men there will always be found a few who ask unmerited favors, who expect disproportionate rewards, who seek to escape disagreeable duties, and who commit flagrant wrongs. If these favors and rewards be refused, and the shirkers and wrong-doers be punished, the disappointed and the guilty ones will both become the enemies of him whom they hold responsible for their fate in the matter, however just his action might have been, or however innocent he might be of any action whatever in the case. Such were the classes of men who were Farragut's enemies. Ever faithful, zealous, and obedient himself, he expected to find the same qualities in those under him, and while quick to command, he was as quick to condemn, his subordinates where he thought

it deserved. Those who think that an officer can obtain the love of all under him, and thus escape making enemies, must remember that that can be done only by failing to disappoint the undeserving, or to punish the unworthy ones, by exercising his power in behalf of all who appeal to him. But "a commander all mercy is a commander unjust" (to paraphrase Byron), and if Admiral Farragut was not all mercy in his treatment of his subordinates, it was only because he was too conscientiously just to be so. It can be truly said that he was always deeply considerate of the welfare of those under his command, always ready to give them a kindly welcome, a patient hearing, and his assistance if they deserved it; and, while he did them innumerable services worthy of special praise, he never deliberately wronged any one of them.

In his private life he was irreproachable. A sincere and consistent Christian (a communicant of the Episcopal Church), a devoted husband, an affectionate father, and a faithful friend, he was besides so amiable and unassuming in his manners that he was not only admired, but was beloved by all who enjoyed the privilege of knowing him. The purity and integrity of his life were unquestioned, and he left to his family and his countrymen the inheritance of a character as unsullied as it was illustrious.

Of the book which is the authority for the principal facts stated in this article, a few words may be called for. The author of it, being the son of his subject, had a peculiarly delicate task to perform, and it is not flattering him to say that he did it as well as any one in his position could do. No man, however, is fully qualified to write a thoroughly disinterested biography of a near relative; the natural inclination to heighten the effect of the bright side, and to conceal, or hastily pass over, the dark side of his subject's character on the one hand, or, in his desire to avoid that error, going to the other extreme, and failing to do his subject full justice on the other, incapacitating such a biographer from being wholly impartial. In the present case the only fault to be found is, that Mr. Farragut, in his evident desire to avoid saying what might be considered too much, has not said enough. The "Life" is composed chiefly of extracts from the letters and orders of the admiral, connected by a mere thread of editorial statement. Admiral Farragut was not a man to write much of himself or of his deeds, and as his son has not, through delicacy, dwelt critically upon either, this family "Life" is necessarily an incomplete one. As an authoritative publication of certain facts which would otherwise never be known, it is, however, an invaluable one, and is a reliable basis for "the complete life of Admiral Farragut," which is yet to be written. In conclusion, it may be said that the book is one which should be in every book-case, and in the hands of every boy, in the country.

JAMES JOSEPH TALBOT.

THE SIGN-LANGUAGE OF THE NORTH AMERICAN INDIANS.

THE paper of Colonel Mallery in the February number of THE UNITED SERVICE, on the gesture-speech of our aborigines, is of much interest to those whose opportunities or necessities have caused them to study the subject. But the writer's erudition and knowledge of philology have not prevented him from falling into serious and fundamental errors, which I desire, at the present time, to point out. He asserts that the truth or falsity of the idea that "the same signs serve as a medium of converse from Hudson Bay to the Gulf of Mexico can only be established by careful comparison of lists or vocabularies of signs taken at widely different times and places;" accordingly, "lists have been collated by the writer, taken in different parts of the country, at several dates from the last century to the last month, comprising together more than eight hundred signs, many of them, however, being mere variants or synonyms for the same object or quality." I quote the exact words from Colonel Mallery's article; for though they seem to give great weight to his negative conclusion, they really furnish a foundation for all his errors, as these observations were not only made at different times, *but were made and described by* DIFFERENT people, who have given *different* descriptions for the *same thing in most instances.* Had one competent person made the observations among different tribes and accurately described the gestures, and had Colonel Mallery carefully compiled these observations, even though he knows nothing practically of the Indian sign-language, I have no doubt his conclusions would have been valuable, and, I venture to say, different from those he now advances.

The ethnology, philology, peculiar habits, and customs of the North American Indians cannot be thoroughly learned or understood by simply consulting books and comparing the opinions of those who do visit the Indians and acquire some little knowledge by actual observation.

No two Indians ever express themselves exactly alike, either vocally or by gesture; but that a common gesture-speech of ancient origin does exist, and is at the present day used by the majority of the tribes from the British to the Mexican line, I am firmly convinced, and my convic-

tion rests on actual personal conversation with representations from the majority of these tribes. That there is sufficient variation in each tribe, and between tribes, to establish the individuality and tribal identity of the person talking is the natural and correct inference. There are even a few words and expressions the signs for which are made totally different, but I assert that by means of this language one can communicate freely without vocal assistance. It is really the court-language of all these tribes, leaving out those bands in the extreme Northwest, west of the Rocky Mountains, who have lost the art and established a vocal jargon for intercommunication. What would appear as rank discrepancy to an observer who knew nothing of the language and little of the customs of our Indians, is easily and readily understood when one is conversant with both. To illustrate: I copy from my notes describing the signs for some six hundred words, as well as some of the peculiar customs which have mainly come under my personal observation. The description for soldier: Bring closed hands, backs up and slightly to rear, well in front of the body; hands at same height, equally advanced and touching at thumbs and index fingers; separate the hands several inches, carrying right to right, left to left.

The Crow Indians and some other tribes at times make the sign for hold or detain instead of the above, viz.: Hold the extended hands, fingers touching, backs outwards well in front of the body, backs of fingers of right hand resting against inner surface of fingers of left hand, index fingers horizontal, forearms nearly so. Move the hands held in this position slightly to the right and left by elbow and shoulder action. At certain times the members of an Indian village are forced, by men appointed for the purpose, to keep together, held, or, as they call it, soldiered; hence the latter sign. The former would seem to come from the sign for bow, riding a fiery horse, both hands to hold him, and the sign for stout or strong; the latter changes creeping in after the Indians got horses, which, for the northern tribes, is of recent date. Now, any one conversant with the sign-language (and this necessitates a knowledge of many Indian customs) would readily understand the Crow sign for soldier, even though he had never seen it before, and *vice versa*. The probable conception of this sign shows how time affects the language.

From Colonel Mallery's article I am forced to believe that he has no practical knowledge of the Indian sign-language, or he certainly would have detected some of the errors in the description for good, chief, day, death, much, etc., and would instantly have seen that the most of the "distinct executions" were descriptions of the same thing by different writers. Colonel Mallery gives for quantity, many, much, six wholly distinct executions and several conceptions, viz.:

"I. The flat of the right hand patting the back of the left several times, proportioned in number to the quantity. Simply repetition.

"II. Clutching at the air several times with both hands. Same idea of repetition, more objective.

"III. Hands and arms passed curvilinearly outward and downward as if forming a large globe, then hands closed and elevated as if something were grasped in each, and held up as high as the face.

"IV. Hands held scoop-fashion, palms towards each other, about two feet apart, at the height of the lower ribs, finger-ends downward; then with a diving motion, as if scooping up small articles from a sack or barrel, bring the hands nearly together, fingers closed, as if holding a number of small objects in each hand, and up again to the height of the breast.

"V. Both hands closed, brought up in a curved motion towards each other to the level of the neck. Idea of fullness.

"VI. Move the two open hands towards each other, and slightly upward; the action of forming or delineating a heap."

As a test for the above, I copy from my notes a description which I tried to make,—a mean of many observations among many different tribes:

Hold the hands well in front and to right and left of body, little lower than shoulders, fingers very slightly curved, separated, and pointing to front, back of right hand to right, left to left; move the hands towards each other, on a slight vertical curve, first downwards and then upwards, terminating movement when hands are few inches apart and opposite each other.

Now, with this as a standard, examine the "wholly distinct executions." The first sign given is similar to the proper one for packing an animal, or "packing up." This might be used in the sense of there being too much to carry; but I am inclined to think it a mistake in some way of the observer. The second, third, and fourth carry about the same obligations, and the fifth and sixth are still more imperfect descriptions of the same sign.

Again, for "good" five diverse signs are given, viz.:

"I. The hand held horizontally, back upward, describes with the arm a horizontal curve outward.

"II. Simple horizontal movement of the right hand from the breast. These signs may convey the suggestion of level,—no difficulty,—and are nearly identical with one of those for 'content,' 'glad.' The first of them is like our motion of benediction.

"III. With the right hand, palm down, fingers to the left, thumb touching the breast, move the hand straight to the front and slightly upward.

"IV. Wave the right hand from the mouth, extending the thumb from the index and closing the other three fingers.

"V. The right hand, fingers pointing to the left, on a level with mouth thumb inward, suddenly moved with curve outward, so as to

present the palm to the person addressed." I again copy from my notes for "good":

Hold right hand, back up, in front of and close to left breast, fingers extended, touching and pointing to left; move the hand briskly well out to front and right, keeping it in the same horizontal plane.

One, two, three, and five are sufficiently near to comply with conditions imposed, and would be about as near as different observers would describe the same sign made by different persons. Number four seems clearly meant for "know" or "understand," and must have crept into a description in some such way as number one under "many."

Again, for "deer" five signs are noticed:

"I. Right hand extended upward by the right ear, with a quick puff from the mouth,—perhaps in allusion to the fleet escape on hearing noise.

"II. Make several passes with the hand before the face.

"III. Forefinger of right hand extended vertically, back towards breast, then turned from side to side to imitate the motion of the animal when walking at leisure.

"IV. Both hands, fingers irregularly outspread at the sides of the head, to imitate the outspread horns. This sign is made by our deaf-mutes.

"V. Same position, confined to the thumb and two first fingers of each hand."

We have in the West the antelope, black- and white-tail deer. The Sioux call the black-tail deer the black-tail antelope, and similarly indicate white-tail deer. For antelope the general sign is:

Bring the hands, back outwards, alongside of the head, near base of the ears, index fingers and thumbs extended and spread, other fingers closed; move hands by wrist action parallel to head from rear to front, repeating motion. For "deer" I copy my notes on the subject, viz.:

Two kinds,—white-tail and black-tail. White-tail deer: conception,—movement of tail and manner of jumping.

Bring right hand, back nearly to right, in front of body, index finger extended, pointing to front and upwards, others and thumb closed; carry hand from right to left several times; hand held a little loosely at wrist so as to give a swinging motion to index finger, imitating as nearly as possible the movement of the deer's tail; then bring right hand, nearly compressed, back to right, in front of and little lower than shoulder; carry the hand upwards and outwards on a curve, bringing it down to same height as when first starting. Frequently the first sign representing the movement of the tail is made with extended hand instead of index finger, as I have given it.

In giving these gestures for jumping it is desirable to bear in mind the way in which the different animals jump, so as to determine the nature or radius of the curve. The white-tail deer jumps high and a

goodly distance, the mountain lion not as high, but longer; the size of the animal has something to do with it, as with a rabbit; here the hand represents very short jumps, though there is one exception of this latter rule, viz., the frog, whose jump is represented as quite long.

Black-tail deer: conception,—movement of the tail and black tip.

Make first the sign representing the movement of the tail, as above described for white-tail; then hold left hand back nearly to left in front of body, index finger extended, pointing about upwards, others and thumb closed; bring right hand, similarly fixed, back up, index finger about horizontal, and place its tip against first joint of left index; move right hand slightly upwards, tip of right hand pressing against surface of left index, rather snapping fast as it leaves it, becoming partially elevated, then make sign for black.

The red deer is called the wood antelope, and nearly always the Indians first make sign for antelope before making the sign I have described. Sometimes they make sign for timber in connection with white-tail, calling him also a "wood" deer.

Number one of Colonel Mallery's descriptions seems imperfect; two and three evidently represent or are portions of the sign for black-tail or white-tail deer. Number four a partial description for an elk, and five for an antelope, though this latter mistake might occur as I have explained, when it was not deemed necessary to enter fully into the matter.

Again, "death," "dead," five signs, viz.:

"I. Right hand, finger front at height of stomach, then, with a sort of flop, throw the hand over with the palm up, finger pointing a little to right and front, hand held horizontal. 'Upset, keeled over.'

"II. Left hand flattened and held, back upward, thumb inward, in front of and a few inches from the breast, right hand slightly clasped, forefinger more extended than the others, and passed suddenly under the left hand, the latter being at the same time gently moved towards the breast. 'Gone under.'

"III. Hold the left hand flat against the face, back outward; then pass the right hand, held in the same manner, under the left, striking and touching it lightly. The same idea of under or burial, quite differently executed.

"IV. Throw the forefinger from the perpendicular into a horizontal position towards the earth with the back downward.

"V. Place the palm of the hand at a short distance from the side of the head, then withdraw it gently in an oblique downward direction, and incline the head and upper part of the body in the same direction. It is worthy of note that there is an apparent connection between this conception and execution and the etymology of the corresponding terms in the Ojibwa dialect, from which tribe this sign is received; 'he dies,' is *nebo;* 'he sleeps,' is *niba.* The common idea is expressed by the ges-

ture: a seeking to rest. The original signification of the root *nib* seems to be 'leaning;' *anibeia*, it is leaning; *anibekweni*, he inclines the head sidewards. The word *niba* or *nibe* (only in compounds) conveys the idea of night, perhaps as the falling over, the going to rest, or the death, of the day."

The first is used in connection with a blow, shot, or violence, and means "knocked over," and not necessarily death. The second is description for the sign to die; death from disease or wounds. The third contains similar obligations to the second, but would rather indicate blindness and death combined. The fourth simply indicates a person falling over, not always death by any means. The fifth indicates sleep, and is used by the Indians rather in the sense of the resting-place of the dead than the act of dying, and sometimes merely sleep. There are some signs so simple, so easily described, that it would be hard to describe them incorrectly; these are given as general simply because no error has been made by the different observers, and it would be impossible for any one not to see that they were describing the same gesture.

To illustrate further what I desire to show: let any three persons attempt a description of exactly the same sign and note what different obligations will be imposed by each of the three persons; present these descriptions to a fourth person who had never seen the gesture and note the result.

That this article may not be all criticism and to give others an opportunity to criticise, I copy from my MSS. a few descriptions and notes made by myself prior to the appearance of Colonel Mallery's article. I would state that I have talked personally with representatives of the Sioux, Cheyennes, Pawnees, Shoshones, Bannocks, Crows, Arrapahoes, Bloods, Blackfeet, Piegans, Nez Percés, Mandans, Gros Ventres, Arrickarees, Assinaboines, Crees, and with Indians who had mixed and had intercourse with the Apaches, Kiowas, Comanches, and others near the Mexican line, and also the Flatheads and Utes, and the signs I describe are common to all these tribes, though, of course, there are in some of the tribes, like the Bannocks, only a few who thoroughly understand gesture-speech, and a few words are made totally different; the art in some of the bands, like the Indian race, is slowly but surely dying out.

I. Brave:

Hold firmly closed left hand about eight inches in front of centre of body, left forearm horizontal, pointing to right and front, back of left hand vertical, and on line of prolongation of forearm; bring the firmly-closed right hand some six inches above and a little in front of left hand, back to right and front, and on line of forearm; strike downward with right hand, mostly by elbow action, the second joints of right hand passing close to and about on a line with knuckles of left hand.

I believe there is no gesture in the Indian sign-language that is as flexible and possesses as much strength and character in its meaning as this, for, when added to other signs, it intensifies their description wonderfully; adds, in fact, the superlative to every idea; gives heroic character to bravery; arrant cowardice to timidity; makes an ordinary meal a feast, and of a fast, starvation; pleasure becomes bliss, and care most bitter sorrow. Pointing to a man and making this sign would convey to an Indian's mind the idea that he was brave, fearless; and this, to them, is the highest, most perfect, virtue, and creates not only respect, but positive reverence. The gesture is not only used in this sense, but to express opposite or antagonistic ideas, as I have stated. If an Indian visited another band, was feasted, given ponies, robes, and arms, he would finish the description with this sign,—he had had a brave time. And "Dull Knife" used it after he told me of his escape from Fort Robinson, going eighteen days in an arctic climate, with one blanket, and a few rosebuds and snow to eat,—"brave hardship," surely. A good time becomes royal, a bad time tastes strongly of wretchedness. A boy is a swift runner,—add this sign and it intensifies the idea of his fleetness; an old man walks slowly,—add this sign and it conveys the impression that he can only drag his limbs along; a man is irritated,—add this sign and he becomes crazed with anger, he is dangerous; one's heart is filled with sunshine on meeting a beloved friend,—add this sign and there are no clouds of distrust or doubt. This sign, though used so often, is seldom used by itself, but added to other signs to complete, perfect, and strengthen them.

II. Bury:

Make sign for wrap, then for digging a hole, and drop the compressed right hand, back down, into the imaginary hole; or hold the extended and separated first and second fingers of each hand opposite each other, and about six inches apart, in front of the body, palms towards each other, tips of fingers slightly higher than shoulders; then place the tips of first and second fingers of right against tips of first and second finger of left hand, holding them horizontal, backs up (keeping left hand in its original position); draw these fingers horizontally to right some six inches; then compress the right hand, turn it, back down, and lay it on the lines drawn by first and second fingers of this hand.

In olden times, and to some extent at the present day, four or five skins, robes, or blankets were spread out, and the corpse laid on them. If a child, its childish possessions, toys and little things in which its babyish heart delighted, were placed by its side; if a man, his bows and arrows, shield, war-bonnet, rifle, ammunition, paint, some tobacco, and pipe, his weapons for the chase and war, and his instruments for peace, were carefully wrapped up with the remains, and round the whole stout cords were tied. Sometimes, if a chief, his favorite war-pony

would be led to his tent just as he was breathing his last, and as his spirit took its flight the pony would be shot, that he might ride to the "happy hunting-ground." At other times one or more ponies would be led to the grave, and after the remains had been securely fastened to the limbs of some tree—to poles placed in the ground—the ponies would be killed. I have seen many of these old graves, which have fallen down, the dust of the man and horses mingled together, bright little flowers and the greenest of grass springing up, drawing their nourishment from both, emblematical, perhaps, of the beauty of the life hereafter.

III. Child:

Conception,—parturition and height.

Bring the right hand, back nearly outwards, in front of centre of body, and close to it, finger extended, touching and pointing outwards and downwards; move the hand on a curve downwards and outwards; then carry the right hand, back outwards, well out to front and right of body, index finger extended and pointing upwards, others and thumbs closed, hand resting at supposed height of child. In speaking of children generally, and in fact unless it is desired to indicate height or age of the child, the first sign is all that is used or is necessary. This sign also means the young of any animal.

Indians are very fond of their children, and treat them, as soon as they are able to understand anything, with the greatest respect and consideration. They never whip them; and no children, I verily believe, are happier than these little, dirty, half-clad specimens of humanity. The mothers nurse their children about as long as the child wants or desires this method of nourishment,—sometimes till four or five years of age,—and in the mean time another child may have come into existence, with whom the spoils have to be divided. Their babies do not cry as much as white babies, as less attention is paid to them, and they do not get what they want by simply crying for it. Still, they carry it on lustily enough at times.

IV. Cheyenne:

Conception,—slashing or cutting the wrists and arms.

Hold the left hand, back upwards, and to left, some inches in front of left breast, index finger extended horizontal and pointing to front, others and thumb closed; bring the right hand, back outwards, opposite, and a little above, left index finger, extended horizontal and pointing to left, others and thumb closed, second joint slightly above left index finger; lower right hand so that right index rests on left, and draw the right hand briskly to right,—repeat motion two or three times.

The men of the Cheyenne Indians rank as high in the scale of bravery, energy, and tenacity of purpose as any tribe I have ever met; in intellect they are the equal of any, the superior of many; and, as a rule, are more virtuous.

Very reliable tradition places them first in Minnesota, and in the vicinity of the present city of Saint Paul. I asked an old man,—he was seventy-six years of age,—who gave me something of their history, where they were before this. And he said, "The Great Spirit made us right there;" he also told me of a miracle that was performed at Minnehaha Falls equal to the "loaves and fishes," and seemed to have perfect faith and confidence in it. "Some few hundred years ago," he said, "they were encamped near 'White Bear' Lake, when one day two of their young men, handsomely painted and gaudily dressed in skins and furs, approached their camp, and said that they had something of importance to communicate to them, and asked them to move to Minnehaha Falls, and to put up near the falls a large council-lodge. They did so, and at an appointed time the two young men went under the falls. As they came out they both held their hands closed, and repaired at once to the council-lodge, where all the men, women, and children had congregated. They noticed that one of the young men had something red in one hand. The young men asked for large stone plates, which were brought. One of them opened his right hand over the plate, and it was immediately filled high with dried buffalo meat. The plate was passed around, emptied, and refilled in this way, until all had eaten enough. He then opened his other hand, and supplied them with tobacco. The other young man opened his hands,—in one was a pipe, in the other seeds of corn and tobacco, melons, etc., etc."

After this they slowly worked their way to the Missouri River, and crossed it about one hundred years ago, near the mouth of Cheyenne River, and from there they went to about the present site of Fort Meade, near the Black Hills, and commenced farming. Some little time previous a Mexican gave one of their chiefs a pony, and they hearing of the wild horses, and other tribes who had ponies, gave up farming and went into the business, apparently, of catching these wild horses and stealing ponies from other tribes. Prior to getting horses they farmed quite extensively. They at this time had about twelve hundred lodges, and were stronger than any other tribe near them. Keeping on a northwesterly direction, they drove the Crow Indians before them, took possession of the country, and roamed about near the head-waters of Powder, Tongue, and Rosebud Rivers, going at times to the mouth of the two latter streams, but not crossing the Yellowstone, or, as they call it, "Elk River," except above the mouth of Tongue River.

The country was full of game. They were prosperous and happy. Finally, the traders and trappers came among them, cheated them, sold them whisky. Their tribe was broken up; some of them went south, and to-day they number only a few hundred. They fought for this country in their wild and savage way, but bravely, and their history for the past few years has been written in blood. Innocent settlers

have suffered cruel outrages at their hands; women and children have gone down to horrible deaths through their rage, fury, and revenge; burning houses have lighted their pathway at night, and they have been hunted like wolves, and shot down like mad dogs, and are now only the wreck of their former greatness.

Perhaps all this is only the legitimate fruit of the policy of a government which has robbed them and lied to them systematically, and rarely held a treaty or promise sacred when to break either would be to its advantage, and seldom conceded a right except through fear.

V. God or Great Spirit:

Make sign for medicine, sign for great, and then point to the heavens with extended index finger of right hand. Sometimes the sign for chief (and frequently the sign for white also),—the Great Medicine Chief or Great White Medicine Chief above in the heavens.

I one day asked a very intelligent Indian, one who keenly feels the loss of his country and the fall of his people, why it was he made the sign for a White God in the heavens; why not a Cheyenne, Sioux, Ponca, or Crow God? He said, "Long ago my people had two Gods above,—one was in the North; he was the God of snow and cold winds, as well as of much of the large game; the other was in the South, the God of warmth, sunshine, growing grass, where the birds all went in winter. And we prayed to these Gods; but the white people came among us,—scatteringly at first, and then like a flood,—they drove away our game in the name of God who was above, lied to us in his name, robbed us of our country in his name, and I think he must be a White God."

VI. Medicine:

Hold right hand in front of and close to forehead, palm outwards, index and second fingers extended, separated, and pointing upwards; raise the hand at same time by wrist action, turn the hand so that tips of extended fingers will describe a spiral curve.

The Indians use this word to indicate the mysterious and unknown. God is the great mystery rather than the Great Spirit, as it is usually translated. We have no one word which can convey the meaning of the word medicine as used by the Indians. Sometimes it shadows forth holiness, mystery, spirits, luck, visions, dreams, prophecies, the concealed and obscure forces of nature which work for us good or evil. When they first saw a pony they called it a medicine-dog; a gun, medicine-iron. They attempt a cure of diseases, namely, by an appeal to the unknown, and try and propitiate this power by self-torture, as in the Sun-dance. We perhaps would have difficulty in locating heaven and hell, and explaining lucidly what we meant by a spirit. They have men who claim to have visions, prophesy, predict, cure the sick by some remedy known only to themselves, and which they insist they learned from the whisperings of some animal to them while asleep; and

these men are called medicine-men. Success crowns their efforts, their medicine was good; and defeat, suffering, death, are the legitimate fruit of bad medicine.

They are close to nature, and are impressed and awed by her wonders and mysteries, and anything which is beyond their comprehension they call medicine. A doctor is a medicine-man, a worker in mysteries, though they have a word coined from the words grass and roots to represent the medicine which he administers, and give this word as a part of his name. Particularly is this the case in speaking of white doctors.

To show something of the idioms and peculiar construction of this language, take

Give:

Hold right hand back to right, fingers extended, touching, pointing to front and upwards, well out in front of body, and little higher than shoulder; move the hand outwards and downwards. If giving to more than one, make the motions as though persons were in your front in a circle. For a free gift, nothing expected in return, make first the sign for prairie,—nothing in sight but the gift. Notwithstanding this we have coined the expression "an Indian giver," to express a donor who invariably gives with selfish motives, hoping to use the gift as capital to advance personal interests. This expression—a "prairie gift"—is always used in reference to gifts made to the poor.

To still further illustrate, take such phrases as

"To expend, trade, or lose a portion and have a remainder left." The appropriate signs are made to represent the property, etc., the trading or losing; and then to express what is left they say, "So much lives."

The expression "Do as you please; it makes no difference to me," is one of the most difficult I have ever met with, and is usually represented by them in this way:

There are two or more roads (the roads representing plans of action); look at them, pick up the one you think good or best. It is even the same to me.

To faint is to die on the prairie.

To win in gambling is to kill. One and the same expression is used when a man meets with success in paying court to the object of his adoration, the idea being, I presume, that all opposition is killed.

W. P. Clark,
1st Lieut. Second U. S. Cavalry.

LAND, HO!

From many a morn to morn
  Hath the world rolled wearily on;
We have wistfully gazed o'er the waves forlorn
  Till the hope in our eyes grows wan;
When hark to the "Land, ho!" hark!
  As the topmast-head lookout,
'Twixt light and dark, like a mounted lark,
  Makes song of his ringing shout.

"Land!" Like a trumpet bold
  O'er the field of the deep 'tis pealed.
Lo! the Field of the Cloth of Gold,
  With the sun as a royal shield!
And the ocean's chargers prance,
  And the King rides forth, and fine
Is his jubilant glance on his own keen lance
  And on broken helms of brine.

"Land!" Like a cloud it soars
  Up from the summer deep,—
A cloud that breaks into silver shores
  And Neversink's wooded sweep;
And the sailor-boy's heart is light,
  And he shouts to the shouting breeze.
Ah! inland quite is that Vale of Delight,
  But he sees his home in the trees.

Laugh out of thine argent lids,
  O Day, with thy deep-blue eyes!
We have builded up white sail-pyramids
  To thee in thy windy skies.
But Hope can mount still higher,
  And Love flies on before;
For wings of fire hath the soul's desire
  In sight of its native shore.

William Gibson,
Commander U. S. Navy.

THE CENSUS IN RELATION TO THE WAR POWER OF THE COUNTRY.

As civilization increases, the means and appliances for promoting and sustaining it increase in an equal if not greater ratio. It is probably not too much to say that the ingenuity of mankind surpasses the present demands on it, and that hundreds of inventions now apparently unnecessary and relegated to the limbo of abortive efforts are destined in the near future to assume the importance which now attaches to articles of daily use. Such has been and such will be the case, and not only is it true in matters affecting the personal comfort of the individual, but it could be readily shown to be the case also in matters apparently speculative. This is an eminently practical age, but it is also one which does not fail to avail itself of matters apparently unimportant, if by so doing it can arrive at a single isolated fact with which to aid in the foundation of a theory or render successful an invention.

The erosion of a pebble and the freaks of an ape enable a Tyndall and a Darwin to shake the foundations of a belief, while in the domain of politics the erudition of this ancient, the gossip of that, and the thousand and one detached facts collected by the ceaseless curiosity of social scientists have enabled such men as Mill and Spencer, Buckle and Lecky, to show statesmen how nations have grown, and by what trivial causes the fabric of modern civilization has arisen. Therefore no matter is unimportant if properly utilized, and it may assume such a situation when brought into relation with others that the philosophic mind is aghast at the consequences its absence would have entailed. That the apparently trivial details which social philosophers pursue should inspire the ordinary mind with mild contempt is inevitable, for ordinary people only look at results and see no more the vast importance which the situation of a lingula assumes in an attack on the Mosaic cosmogony than they see the relation of the colors of the spectra to the products of a Bessemer furnace; they only accept the consequences of the one and the other, and are indifferent to the methods by which they are procured. The value of a systematic arrangement of facts is, however, conceded, and it is to collect, consolidate, and present them in their relation to one another that the census—the direct product of all this ceaseless inquiry—has grown from a simple numbering of the tribes

to be a vast repository of information, drawn upon by every profession and trade. From it the statesman seeks the statistics to call new commonwealths into existence; the merchant the information on which he freights fresh argosies; and the constant special inquiries propounded cause it to become more exhaustive in its researches each decade.

In nothing has the change in arts, science, manners, and government made greater revolution than in the conduct of war, and probably no profession is more dependent than the military on the nice relations existing between many and distinct facts. The modern general, under which personality I combine the government which determines, declares, and prosecutes war and those charged with the execution of it, needs for his assistance a contribution from all the items which are generalized as knowledge, and, as war is something which, unforeseen, must be always prepared for, nothing should be omitted to secure that preparation which wise statesmanship can devise. It is therefore strongly urged that the forthcoming census should be so directed as to secure in a compact and manageable form such data of special value to the war-making power as may enable it to utilize the resources of this great country in the event of war with rapidity, proper economy, and wisdom. It cannot be urged that the collection of specific information on questions affecting military matters is foreign to the peaceful purposes of a census. The lavish waste of the national resources which characterized our late war left a burden of unnecessary debt, which hangs and will hang for many a year around our necks, and which burdens to a greater or less degree every trade. Millions could have been saved, and other millions expended to advantage, had we possessed the statistics regarding our war resources and necessities which it is to be hoped will now be collected, and therefore an inquiry, which on the first flush would appear warranted only by the necessities of an insignificant proportion of our population, shows itself to be intimately connected with the welfare and prosperity of our whole people.

To pass, then, to the subject, the importance of which we will take to be conceded, an endeavor to detail some of the special objects of inquiry will be given, leaving to specialists the methods of obtaining and consolidating the information. An army is necessary, is authorized, is recruited, organized, instructed, clothed, rationed, supplied, transported, and finally used.

As Lord Brougham declared that the whole purpose of the British constitution was to get twelve honest men into the jury-box, so all the vast machinery incident to the propositions thus enunciated is put in motion to place two men in antagonism to one.

The statistics which the most ordinary census agent can collect on the proper form can then be so digested as to materially assist in deciding all the questions involved.

I. Is an army necessary? And by the army is meant a force rep-

resenting and executing the will of the government. Military force is rarely appealed to in this country, at least until the ordinary resources embodied in public opinion and the courts of law have failed. Under that heading, therefore, the special objects of inquiry should be as to the characteristics of the people,—their respect for law,—the power or nullity of the civil authority on occasions of great excitement, and the antecedents of the people in such cases.

Experience has shown that certain sections of our country require, on occasions when the execution of the law is in opposition to the feelings of the people, the presence of an armed force, unconnected by ties of blood and interest with the parties involved; in others that it is not only unnecessary, but, from the temperament or traditions of the people, a positive hindrance to a peaceful and proper solution of difficulty, and in others that it is merely a useless waste of national strength in a case where the local authorities are ample. The questions, therefore, that a census collector should ask or in other ways obtain an answer to, to bear on the *necessity*, of armed force in any particular locality, must base themselves on the statistics of violent crimes and lawlessness of the people, and in addition, on their derivation. For, while under the operation of ordinary laws, consonant with their prejudices and training, a community may obtain and retain a reputation for sobriety and peaceful habits, a very slight change in the methods or policy of the supreme power might cause it to pass to open rebellion. No community was simpler and more peaceful than the Bretons of France, yet an attack on the objects of their reverence, their religion, and the ancient country nobility, stirred in these gentle peasants the disposition and will for the pertinacious wars of La Vendée; while, on the contrary, among other nationalities, the mere presence of a few soldiers restrained the outbreak or curbed the exercise of the most unbridled violence. With the one the tact and statesmanship of a Hoche was needed, with the other, the decision of a Charles the Fifth at Antwerp is required. All these questions, therefore, should be attended to. It is not to be supposed that an infallible prognosis of what a community would do under all circumstances can be deduced from a table of statistics, but one can more readily arrive at what is best to be done under certain circumstances if he knows what is the calibre, history, and breeding of the people concerned.

II. The *authorization* of a force results from the necessity, though not always. Occasions may arise where, although the necessity of the use of troops is conceded, the character of the troops themselves, or the relations which they would be likely to assume with the parties they go to hold in order, must be taken into consideration. In event of the occasion which calls for them being such that the troops at our disposal would sympathize with the malcontents, either the employment of troops must be abandoned or recourse must be had to such as either do

not sympathize with them or are likely to be uninfluenced. Upon this we must either draw from other forces than those immediately available, or recruit new forces, or abandon entirely the idea of a recourse to force. Both the necessity and the authorization of military measures, therefore, —restricting it to the suppression of domestic violence,—depend on political and social conditions, the understanding of which may be well aided by statistics, and reduced to a certain extent to a question of tables. It is possible that this may be considered an extravagant idea of the possibilities of a census, and that such questions cannot be decided by rule, but still all judgment is based on a greater or less accurate knowledge of facts, and it does not appear to us any more strained than the application of statistics to the solution of great economical problems. There is an increased belief that the mental and moral growth or decadence of a nation is as subject to certain and fixed laws as its material condition, and that what are considered the phenomena of history are no phenomena at all, but events which could have been prevented or hastened by a proper exercise of the power to understand them with which modern science has invested us. But passing by as debatable the real value of inquiries instituted for these purposes, there can be no doubt that all other heads heretofore enumerated have a fixed and important value in determining the solution of military questions.

We will presume the war necessary and determined on, and the army to be raised.

III. The subject of recruitment must then be considered. Where quickest can we raise our army, so that it shall be composed of the best material (all things being considered) for our purpose, or where can we best go for the troops requisite for this purpose and that?

The fault of our present system of recruitment is that we do not take into consideration the personal aptitude of the soldier. We raise our cavalry from men who have never backed a horse, and we send to the prosecution of operations which require special skill men and officers entirely unfitted by a previous occupation to perform them. We put the round men in the square holes, and the square men in the round ones. We send regiments enfeebled by the sedentary life of our factory villages to endure the greatest hardships, and we place in the ease of garrisons those whose physique fits them for the severest bodily endurance. I am speaking of our late war. A thorough general knowledge of the aptitude, the former pursuits, and capacities of our raw material would enable the organizing powers to compose their divisions or corps with just the class of men required for the special object to be attained; and if operations are to be conducted which require an engineer army or a cavalry army, or any other special force, the recruitment should be made among those classes of our population most fitted from previous occupations to be quickly brought into effective condition. Assuming that all our population are equally brave, it would be manifestly absurd

to send an army raised from the cities to carry to a successful and prompt conclusion an operation necessitating much rough, arduous labor, such as road-building, cutting through timber and heavy intrenchments. For maritime expeditions we would want troops accustomed to boats, quasi-seamen, such as we can find on the Atlantic coast. For cavalry we should seek our material among the equestrian people of the South and West, and for operations involving the repairs and running of railroads, the utilization of captured arsenals or depots, men from the industrial centres of New England. For mining operations we should expect to find our recruits in Pennsylvania, and so on.

IV. In regard to organization, the same rules hold, and a further one, that for the purpose of quickly teaching this mass we ought to know whom among our recruits had had any previous experience, either in active war or in the ranks of the militia, of tactics and the habits of camps. By a proper admixture of these comparatively instructed officers and men with perfectly green troops we would more easily discipline and instruct our army. It may be further observed that in the matter of recruitment, if the object is not so much to form a large as a good and disciplined force, the intelligence, subordination, and inclination to the military profession of our raw material might well be considered.

No soldier can be too intelligent, and where that quality is united with respect for authority, which can be deduced from the statistics of crime, and an aptitude for the military profession, which the proportion of militia to the whole number of inhabitants will show, we have at our disposal in a very short time a homogeneous and manageable army.

V. Now, then, that our material is secured and properly classified according to the proportions of each arm required, comes in the equipment and rationing and after-supply,—all means to its proper use.

When large bodies of men are to be suddenly prepared for service, the demands for their supply are apt to derange the whole industrial system. Ordinarily speaking, it is best to procure the supplies in those markets most occupied in the manufacture of special articles, but in this case there is an imperative demand for cloths and provisions, wagons, camp equipage, medical supplies, and implements of war, powder and shot. There are in almost all parts of our country manufactories of articles for local use which can be utilized, distributing thereby not only the strain of a sudden demand over the whole country and saving time and money, but at the same time distributing among the people, in the payment for such supplies, the public money which otherwise, going to a few localities, increases the wealth of perhaps those who contribute the less in men, and throws the burdens of war unduly on those who furnish the bone and sinew. In other instances an accurate knowledge of the resources of a country which may become either the seat of war or be contiguous to it, would prevent the unnecessary accumulation of provisions and supplies which the locality itself

could supply. These items are of vast importance in the economical as well as rapid conduct of military operations, and, if made matters of statistics, would materially aid a general in the conception and carrying out of his plans. Having all this information to aid in the preparation for war, now comes in the question of utilizing it, which embodies itself in the questions of transportation, topography, and climatic and social considerations.

The means of transportation and sources of its repair, both animal and mechanical, by roads, railroads, river, and water, should be thoroughly known for all localities; the condition of the roads, the ability of the inhabitants to assist in such transportation, either willingly or by compulsion; the rolling-stock of railroads, and the character of the road, whether double or single; the amount of tonnage both of sailing and steam vessels; the navigability of rivers, and the character of harbors; the fuel supplies,—these and many and various items could be thought of which could all be usefully sought for, condensed, and made available. The mean average temperature, prevailing diseases or general healthfulness, general questions which might aid in forming an opinion of the prospective health of troops in event of protracted operations in the quarter,—all these suggest themselves as valuable information. There remain, then, only questions of topography and the physical nature of the country, whether generally level, rolling, or mountainous; well watered, well wooded, rocky, or sandy; what local maps, if any, exist; and other elements of information which would give the salient facts of the terrain or means to readily arrive at them.

This is a subject which can be but briefly and unsatisfactorily treated within the limits of an article of this description. It is not too late for a scheme of inquiry to be elaborated which would educe a fund of highly valuable and important information. A commission composed of officers of experience and ability, and comprising representatives from all arms, might, before the taking of the next census, unite on a set of questions which would produce tangible results on matters purely military or affecting the military.

These questions being answered, could be turned over for careful consideration, and from the information thus obtained and the other results a blue book could be specially prepared, from which a fund of information could be derived on occasion and as experience dictates. Future censuses would enable the statesman, the legislator, and the war minister and his subordinates to decide on and prosecute war with a certainty of valuable results impossible in the present chaotic state of our information.

HARRY C. CUSHING,
Captain Fourth Artillery.

WILLIAMSPORT, WASHINGTON COUNTY,
MARYLAND.

WANTS OF THE NAVY—CANNON.

III.

UNDER the same caption as our last two numbers we resume our self-imposed work of the discussion of cannon, and of presenting to the naval and other readers of this magazine information on the subject of new cannon that are being constructed in England. We now have a steel gun for our consideration.

The introduction of an English gun constructed entirely of steel calls for some remark, from the fact that the gun that is universally accepted as being essentially English has always been proclaimed as a wrought-iron gun, and great claims for "safety" have been made on that account in favor of it as opposed to steel. But we find in England a *bona fide* steel gun, the manufacture of which has been carried on for years; and yet, admirable as we shall see is its design, it has been almost entirely ignored in Europe.

The reason for this lies in a deep-rooted characteristic of our "kin beyond sea," than whom no nation is more influenced in its opinion and preferences by official fiat. The stamp of official patronage was, at an early stage, given to the wrought-iron gun, and that made it current. The system of construction proposed by Sir William Armstrong in 1855 was adopted in the government factory at Woolwich in 1859, at which time Sir William was the superintendent of the establishment. This gave a national character to the system of construction, and it became almost an act of treason to call in question the superiority of the system that had been adopted by the government. Powerful influences and immense interests from all over the country became involved in the Woolwich factory, and no opposing effort could avail to stem the current of popular prejudice and enthusiasm. The London Ordnance Works, which, under the direction of Mr. Vavasseur and Captain Blakely, had turned out guns which had proved eminently successful, was crowded out, as it were, and the whole energy of the government was directed in the one channel of the manufacture of the wrought-iron gun. It was not until the late national defeat, which the so-called English gun encountered on the field at Meppen, that the leading papers in London dared to call in question the perfection of the Wool-

wich manufacture, and to go so far as to throw discredit upon the practice of supporting a steel tube by wrought-iron coils. This is the essential error in the Woolwich construction, and it is this point which is now openly assailed in the newspapers by writers who are evidently artillerists and familiar with the subject of which they treat.

The tide has turned in favor of steel, and the gun that we present in this article may soon attract more attention not only in England, but from the rest of Europe. During the past years of neglect from the home government the London Ordnance Works, now known as the firm of J. Vavasseur & Co., have been employed in furnishing guns of their manufacture to the governments of South America and Asia; also a few to the French government; but Europe may soon be convinced that England has, in the Vavasseur steel gun, a piece that can compete successfully with the manufacture of Mr. Krupp, which has so badly beaten the productions both of Woolwich and Elswick.

The plate represents the Vavasseur 9-inch breech-loading gun, which is now under consideration at the London Ordnance Works. This gun is expected to compete successfully with Krupp guns of similar calibre, and to retain superiority over the guns now being produced by the supreme efforts of Armstrong and Woolwich. In the construction of this gun there is nothing that differs materially from that of all previous Vavasseur guns; the tube is lengthened so as to burn more powder than formerly, this being necessary to achieve the increased velocity now required; but the increased size of the powder-chamber and the air-space admit of this being done without imposing any additional strain upon the wall of the piece. The tube is of steel, oil tempered; the jacket is of steel, cooled in oil after being adjusted in its place; and the outer hoops of steel are shrunk on untempered. The only novelty introduced into the manufacture of this gun is the manner of cooling the jacket after it is placed in its position around the tube. In previous guns this was allowed to cool slowly in air, but a great additional strength has been found to be derived from immersing the jacket in oil as soon as it has been put into position, and thus tempering it. The material of which the jacket is composed is Whitworth metal (steel compressed while fluid), and the following is the result of tests of this metal made by Kirkaldy, in London, in October, 1879:

TESTS OF WHITWORTH METAL.

Soft, as received from maker.

Stress, elastic, per square inch	17.1 tons.
" ultimate, per square inch	33.5 "
Extension in two inches	0.39 inch.

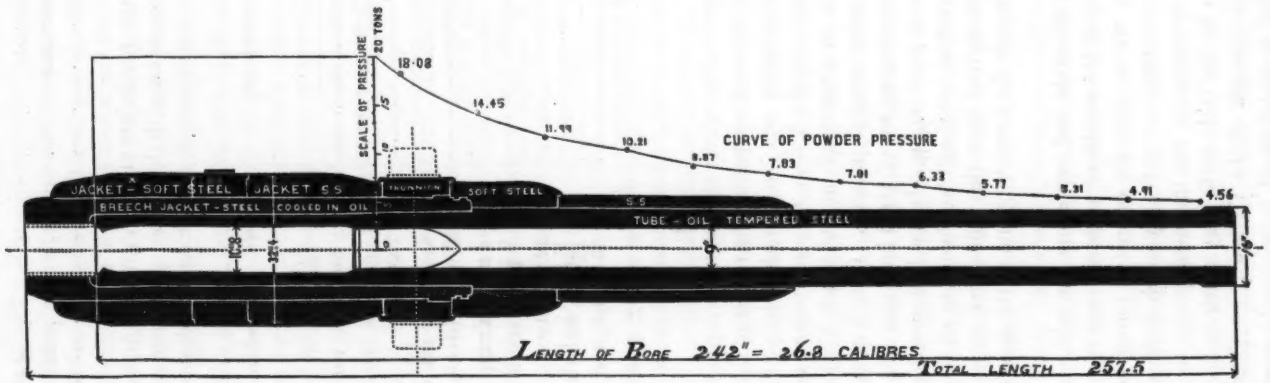
Tempered in oil, low heat.

Stress, elastic, per square inch	21.5 tons.
" ultimate, per square inch	41.5 "
Extension in two inches	0.39 inch.

9-INCH VAVASSEUR B.-L. STEEL GUN OF 13 TONS 8 CWT.

Weight of gun, 13 tons 8 cwt.; weight of charge, 150 pounds; weight of projectile, 300 pounds.

Initial velocity, 2045 feet per second; total energy, 8700 foot-tons.



* By soft steel is meant untempered steel.

Tempered in oil, high heat.

Stress, elastic, per square inch	25.8 tons.
" ultimate, per square inch	43.2 "
Extension in two inches	0.32 inch.

The following are the particulars of the Vavasseur 8- and 9-inch guns, and we place in connection with them those of the new Armstrong and Woolwich guns for convenience of comparison and discussion:

Particulars of Guns, Breech-Loading.	Woolwich.		Armstrong.		Vavasseur.	
Size of gun, bore, in inches	10.4	9.2	9	8	9	8
Weight of gun, tons	26½	18	18	11½	13½	9½
" projectile, pounds	462	320	250	180	300	200
" charge, pounds	231	160	150	90	150	100
" gun in projectiles	127	126	161	143	100	106
Initial velocity, estimated	2,075	2025	2118		2045	1975
" " actual				2002		
Total energy, foot-tons	13,789	9096	7774	5001	8700	5408
Energy per ton of gun, foot-tons	525.3	505.1	432	434.8	644	569.3
Weight of gun in pounds, per foot-tons of energy	4.27	4.43	5.19	5.15	3.45	3.93
Energy per pound of gun, in foot-tons	0.23	0.22	0.19	0.19	0.28	0.25
Penetration at muzzle of unbacked iron plates, in inches		20.3	17.8		20.2	16.1
Penetration at 1000 yards		17.9	16.2	13.1	17.6	13.7
" " 2000 "		15.6	13.7		15.3	
" " 3000 "		13.6	11.5	8.86	13.2	9.84
Strength of gun to resist an internal pressure, per square inch, in tons	25.15	25.15	25.27	24.58	29.1	24.24

The above table of particulars is very thorough, perhaps exhaustive, and affords a convenient means of comparing the results of the different systems. By way of illustrating our last remarks relative to the new plan of treating the jacket in the Vavasseur construction, we call attention to the difference in the strength of the 8-inch Vavasseur and that of the 9-inch to resist internal pressure. This is caused by the fact that it is only in the construction of the 9-inch gun that the plan of cooling the jacket in its place on the tube has been practiced. This is a new feature in the process, but it will be adopted in all future guns. Even without the benefit derived from this refinement, we see that the Vavasseur 8-inch gun equals the Armstrong gun of the same calibre in strength.

By an inspection of the table, and comparing gun with gun, we see that in the Vavasseur gun the weight of projectile and the charge of powder are in excess; we see that the estimated initial velocity is somewhat less, but that the total energy is very much increased. This naturally prepares us to recognize the increased power to penetrate armor, which is shown by the table to be very much in favor of the Vavasseur gun; and the strength of the Vavasseur gun, especially in the case where the jacket is cooled in oil, is immensely superior, and,

even when not cooled in oil, is very nearly equal to those placed in comparison.

Even from the comparative references above made, it would be hard to refuse to award to the Vavasseur gun the meed of superiority; but when we look at the comparative *energies per ton of gun*, we must be struck by the great advantage that is derived from the use of steel, which admits of obtaining superior strength and energy with a greatly-reduced weight of gun. By comparing the Vavasseur and Armstrong guns of like calibre, we find that with equal strength to resist internal pressure, and with a difference in weight, in the case of the 8-inch gun of 2 tons, we have in the Vavasseur gun an energy developed per ton of gun of 569 foot-tons against 434 in the Armstrong gun; and when we compare the 9-inch guns of the same makers, we have, with a difference of weight of 4½ tons, an energy per ton of gun of 644 foot-tons as compared with 432.

It is not possible to conceive of any standard of comparison that can be more fair and more convincing than this one of energy per ton of gun, and there is no way of getting away from the conclusion that it forces upon the mind on the subject of the relative advantages of steel and wrought iron for cannon. The comparison is perfect as presented in the above table of particulars of guns, and the table itself leaves nothing to be desired; it is exhaustive, and the conclusion must be, that, if a certain energy is required to be developed, and if we are at all restricted in weight of gun, we must adopt for our construction such metal as will develop the greatest energy with the least weight of gun.

This point bears directly on the statement that we made in our article under the same caption as this paper in the May number of this magazine, where we asserted the necessity of steel for our future armaments. In that number we presented some suppositious guns for the armament of our unarmed cruisers; but the above table of particulars, which we are now able to give, of guns now on trial and under construction and consideration, takes the subject out of the field of speculation, and presents us with actual examples which embody the idea that we suggested before the important particulars given above came to hand.

We think that what we have given above sufficiently establishes the superiority of the character of the metal and the system of construction of the Vavasseur works over those of Armstrong and Woolwich, but we regret that we have not at hand an authoritative account of the late manufacture of Mr. Krupp to place in contrast with the Vavasseur gun. The student of the history of constructions of cannon will find that the Vavasseur gun has been a perfectly-constructed gun ever since its inception, and that the only change now made in the manufacture is in the way of shrinking on the jacket, and in the sub-

stitution of the Whitworth compressed steel for the forged steel formerly used for the jackets; the comparatively thin tube, the long, rigid jacket, and the outer hoops remain as in the earlier guns of this construction.

During many years, on the contrary, the system of construction at Essen has been going through gradual but decided changes. The original solid steel gun of Krupp was modified by having hoops substituted for a portion of the metal behind the trunnions; in large guns two tiers of hoops have been shrunk on over this portion of the gun, while the thick tube, continued to the muzzle, formed the chase of the gun. The blowing off of the chase of some of these guns led to another modification by turning down the metal of the chase and shrinking hoops on in the place of the removed metal; and now we hear of long hoops—jackets, in fact—being shrunk on over the breech portion of the tube. All these modifications, which have been made from time to time, have resulted in the gradual adoption by Mr. Krupp of the system of construction that was thought out years ago by Mr. Vavasseur, and which has been successfully practiced by him to the advantage of South American and Asiatic armaments, while his own countrymen have not been able to recognize that they had at home a gun which was superior to anything that was being manufactured abroad, and which has formed a model for imitation at Essen. The prestige gained by the manufacture of Armstrong when rifled cannon were in their infancy, and the subsequent immense interests that became involved in the Woolwich gun-factories, has kept the attention of the English authorities turned away, as it were, from the English steel gun; and even now, when the shock of the defeat at Meppen is upon them, we see that the authorities still cling to their idols, and are making supreme efforts at Woolwich and at Elswick to raise the standard of their guns, still persevering in their old combination of steel and wrought iron, so immense are the interests at stake in the continuation of the old system of construction; it is only in the able artillery articles in the daily papers in London that we can find a decided call publicly made for guns of steel, and if history is to repeat itself in this, we will find that the voice of the people will be heard, and that the English steel gun will soon be brought to the fore.

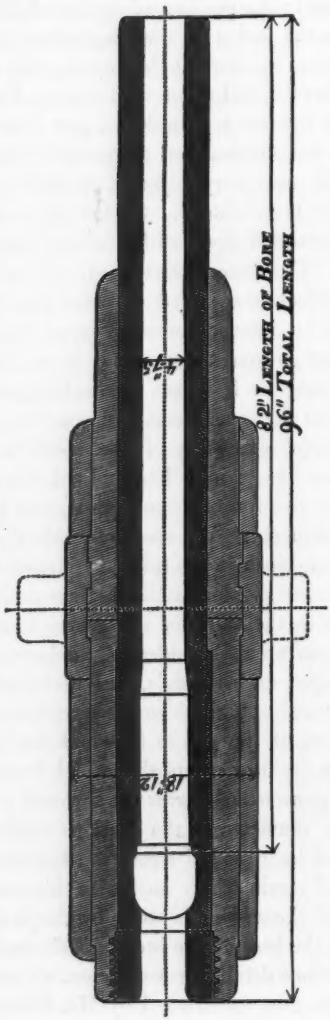
Before leaving the Vavasseur gun we wish to call attention to the plan adopted for closing the breech. The French plan has been adopted, but it is to the way in which it is applied that we call attention. It will be seen by reference to the plate that the breech-block is received by the jacket; it is entirely independent of the tube; by referring to our plates of the Armstrong and Woolwich guns of the new breech-loading construction in the June number of this magazine, it will be seen that in both of these guns the breech-block is screwed into the base of the tube. In the case of the last two guns this is a neces-

sity, from the fact that the wrought-iron coil which forms the reinforce for the steel tube is utterly unable to supply the strength necessary to resist the longitudinal effort of the charge to blow out the breech; but no such necessity applies in the case of the Vavasseur gun, as the steel jacket affords all the strength requisite to resist this effort, and a great advantage results from this change in the position of the breech-block; it, in fact, shifts from the tube to the jacket all the longitudinal strain that is exerted in the bore of the gun to blow out the breech; this must have a great effect in relieving the tube, and a gun with this application suggests the idea of much greater endurance than does a gun where the tube is called upon to resist both longitudinal and tangential strain.

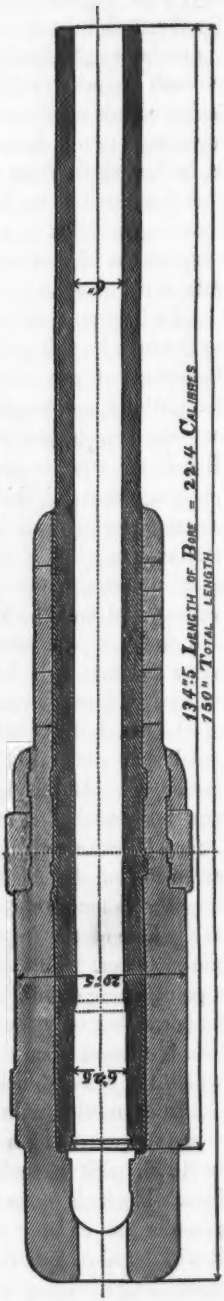
An inspection of the plate will make very apparent the relief given to the tube by this position of the breech-block. On the explosion of the charge of powder an effort is exerted from within which acts both tangentially and longitudinally. The latter effort is exerted to blow out the breech, and the breech-block is expected to resist this effort. But if the tube be subjected to an internal pressure equal to compressing the metal, this metal must go somewhere, and if it can extend circumferentially, all is well so long as it is not strained beyond its elastic limit; but if the tube be at the same instant subjected to a longitudinal strain, the circumferential extension of the metal is prevented, and thus the metal is forced to go in a longitudinal direction, and under the influence of these two forces it must yield, and transverse fracture will be the consequence. We see from this that, in in case of guns having the breech-block in the tube, the inner surface of the metal of the tube is subjected to a longitudinal strain much beyond that which is rightly due to the effort of the gas to blow out the breech. In the case of the gun we are considering, the bore of the gun is formed of a true tube, open at both ends, and under violent internal pressure there is no practical opposition to the circumferential extension of the metal; the effort of the gas to blow out the breech imposes no longitudinal strain on the tube except that which is exerted at the base of the frustrum of a cone which forms the forward part of the chamber. This difference of diameter in the chamber establishes a point where a certain amount of longitudinal strain must necessarily be borne, but only that portion of strain which is due to this contraction is thrown upon the tube; all the residue is borne by the jacket in which the breech-block, forming the base of the breech, is situated.

In connection with this important detail in construction, we present a plate representing a 40-pounder gun constructed by Mr. Vavasseur in 1866, with French fermeture, in which it will be seen that the breech-block is screwed into the jacket. We also present an 80-pounder gun of later construction, with the Krupp fermeture, in which it will be also seen that the effort to blow out the breech is thrown upon the jacket and not on the tube. It will thus be seen that this

40-Pr. B.-L. Vavasseur Steel Gun, with Breech Mechanism in Jacket.
Made in 1867.



80-Pr. B.-L. Vavasseur Steel Gun, with Breech Mechanism in Jacket.
Weight of gun, 66 cwt. Present construction.



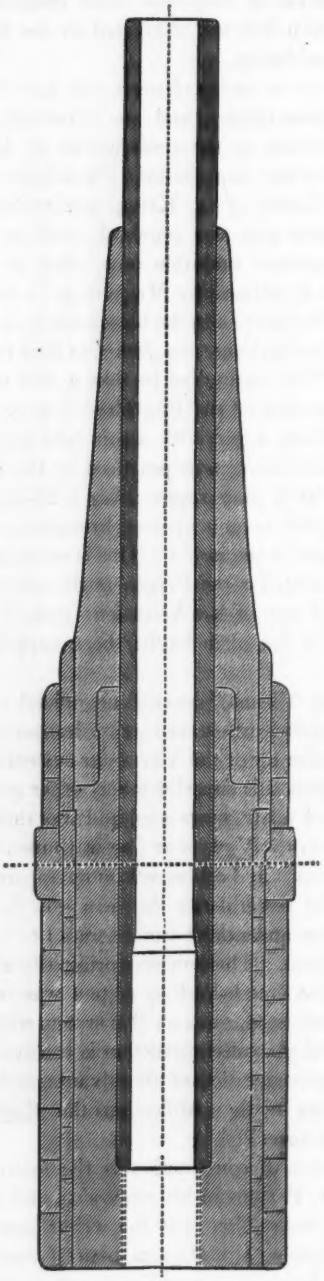
detail of construction is one of long-established usage at the London Ordnance Works, and that it is not originated in the new 9-inch gun which we have been considering.

We called attention above to the changes that have been constantly made in the Krupp manufacture, and we remarked that all these changes have approximated to the construction of Mr. Vavasseur. This must be apparent to any unprejudiced investigator who will take the trouble to trace the history of the Krupp construction, and to compare it with the Vavasseur gun as a standard; and we repeat our former assertion of this persistent imitation now, when we state that the latest improvement that is claimed by Mr. Krupp in the manufacture of his new guns is that he has placed the breech-block in such a position as to relieve the tube and to cause the jacket to bear the longitudinal strain of the charge. Thus again does he take a step in advance, following the lead of the maker of the English steel gun.

The system of building a gun with a thin tube and relieving it of longitudinal strain is also being now practiced by the French government, and we give (p. 50) a plate representing a 27-centimetre gun of construction of 1873, which is built of steel throughout, and which carries the breech mechanism in the jacket. This is without doubt adopted from the Vavasseur model, for the French is the only government in Europe that has adopted any of the Vavasseur guns, a few of the 40-pounders represented in the plate having been supplied to them in 1873.

As a "looker-on in Vienna," having no official connection with ordnance, and in a magazine article, the writer has no hesitation in exhibiting himself as an admirer of the Vavasseur system of construction, and to assert his belief that it is superior to any other gun in the world. This opinion was formed many years ago, and was then stated in official report. At that time the Vavasseur gun was much what it is now, and the difference between it and others was more apparent and decided than now, but the closer resemblance that can now be recognized between the Vavasseur gun and others can be traced to imitations made of it, taken as the standard. The gun was originally a muzzle-loader, but the advantage of the breech-loading system was recognized at an early date, and, as we have seen, guns on this system were built as early as 1866; but the general plan of construction is the same now as it has been for years, and the recognition of its advantages is being shown now by other gun-makers by the modifications that they are making in their systems of manufacture.

The Vavasseur system of construction is the main feature which has been applied by Mr. Parsons in his *conversion*, and it was to obtain the advantage of this construction that the writer committed himself some years ago to proposing the Parsons plan of conversion for our cast-iron guns, and he has not seen any reason to regret or to modify



FRENCH STEEL GUN, MODEL 1875. 27 CM.

Weight of gun, 27 tons.
Weight of projectile, 476 lbs.
Initial velocity, 1560 ft.

the recommendations made at that time. We present in the accompanying plate (p. 52) a proposal for the conversion of our cast-iron ordnance on the Parsons system, involving the Vavasseur plan of construction.

The proposed conversion is of the 11-inch Dahlgren to an 8-inch rifle with French breech mechanism. The cast-iron gun forms the outer casing, inclosing within it a Vavasseur gun, consisting of an oil-tempered tube of steel reinforced with a jacket of Whitworth metal shrunk on in oil. The tube extends to the rear of the casing, and the jacket to the rear of the tube, and the screw of the breech-block works in the jacket. The tube extends also beyond the muzzle of the cast-iron casing, and is reinforced along a portion of its projection by a steel ring, which, besides, acts as a counterpoise to the weight of the rear projection. The length of the bore of the converted gun is thus raised to 160 inches, or 20 calibres, as compared with 128 inches, or 16 calibres, in the 11-inch smooth-bore. This length of bore admits of burning a charge of 60 pounds of powder, giving a velocity of 1631 feet per second to a projectile of 200 pounds, which, with a total energy of 3690 foot-tons, will pierce 12.73 inches of iron at the muzzle, and at 2000 yards will pierce 10.12 inches of iron. The weight of this gun is about 8.73 tons, and the same eccentricity of trunnions is required as is now adopted in our Palliser gun of the same calibre.

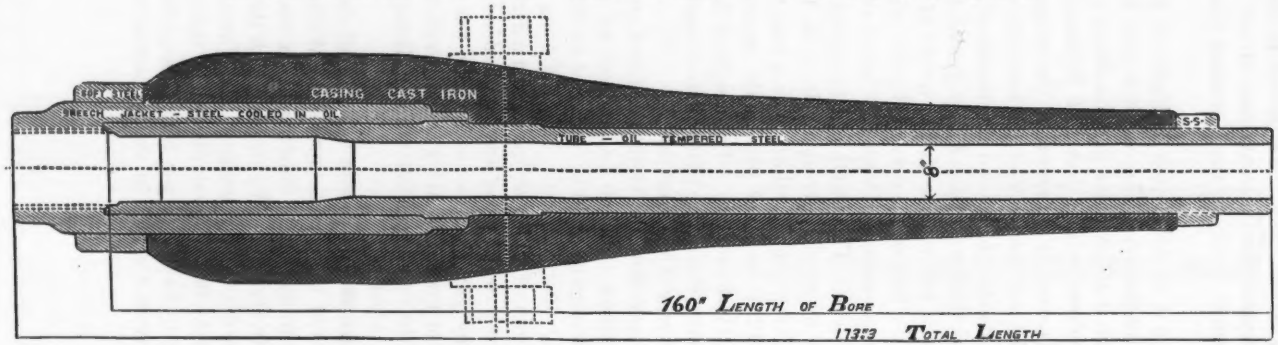
The power that is developed from the 11-inch cast-iron gun by this conversion is very much greater than can be produced by any other plan; and our 9-inch cast-iron guns could be converted by this system into most serviceable 6-inch rifled cannon. They could not compete with the 6-inch Vavasseur gun, of which we have given a drawing, for this piece may be regarded as a model piece, more applicable to general purposes, probably, than any gun that was ever made, but a 6-inch rifled gun on the conversion system of Mr. Parsons would be a most useful gun, and would not be very expensive, while utilizing our old material.

For convenience of comparison, we present below in tabulated form the elements for 8-inch guns of the manufacture of Sir William Armstrong and of Mr. Vavasseur, and of the conversions on the plans of Sir William Palliser and Mr. Parsons. We associate with them in the same table particulars of the 6-inch 80-pounder of Mr. Vavasseur, and we call particular attention to the energy developed by this comparatively small gun, especially to its *energy per ton of gun*, which compares with the Palliser converted 8-inch in the proportion of 401 to 350:

PROPOSED CONVERSION OF 11-INCH S.-B. GUN INTO AN 8-INCH B.-L. RIFLED GUN—BREECH CLOSED BY SCREW.

Position of trunnions same as required for this gun when converted to an 8″ M.-L. rifle.

Length of bore, 160″ = 20 calibres. Diameter of bore, 8″. Weight of gun, 19,550 pounds.



Power of the above Gun with Various Charges.

	Weight of Charge.	Weight of Shot.	Gravimetric Density of Charge.	Cubic Inches per Pound.	Number of Expansion.	Initial Velocity. Feet per Second.	Pressure. Maximum Tons per Square Inch.	Total Energy. Foot-Tons.	Energy per Inch of Circumference. Foot-Tons.	THICKNESS OF PLATE WILL PIERCE.		
										At Muzzle. Inches.	At 1000 Yds. Inches.	At 2000 Yds. Inches.
	lb.	*lb.*										
With chamber as shown above.	60 P.	200	0.833	33.22	5.07	1631	18	3690	147.6	12.78	11.4	10.12
	55 "	"	0.763	36.29	5.53	1504	16	3135	125.4	11.49	10.3	9.16
With chamber modified.	50 "	"	0.833	33.22	6.04	1537	18	3275	131.0	11.81	10.6	9.4
	45 "	"	0.750	37.27	6.7	1418	15.5	2790	111.6	10.69	9.6	8.57

Elements for 8-inch Guns of Armstrong, Vavasseur, Palliser, and Parsons, and 6-inch Gun of Vavasseur.

Particulars of Guns.	Armstrong.	Vavasseur.	Palliser Conversion.	Parsons Conversion.	Vavasseur 80-Pounder.
Size of gun, bore, in inches	8	8	8	8	6
Weight of gun, tons	11¼	9½	7½	8¾	4
" projectile, pounds	180	200	180	200	80
" charge, pounds	90	100	35	60	25
" gun in projectiles	143	106	95	97	112
Initial velocity, estimated		1975		1631	
" " actual	2002		1450		1700
Total energy, foot-tons	5001	5408	2627	3690	1604
Energy per ton of gun, foot-tons	435	569	350	421	401
Weight of gun in pounds, per foot-tons of energy	5.15	3.93	6.47	5.29	5.58
Energy per pound of gun, in foot-tons	0.19	0.25	0.15	0.18	0.17
Penetration at muzzle of unbacked iron plates, in inches		16.1		12.73	
Penetration at 1000 yards, in inches	13.1	13.7		11.4	
" " 2000 " " "				10.12	
" " 3000 " " "	8.86	9.84			

We think that the above table presents as concisely as possible the results that have been, and that can be, reached by the different systems of construction and conversion that we have been considering. We have taken the calibre of 8 inches as a convenient standard for comparison, and by associating them in one table the comparative results are apparent at a glance.

We place the Vavasseur 6-inch gun in equal prominence, because it seems to us to be the most desirable piece to be substituted as a broadside gun for our 9-inch smooth-bores. Our 9-inch cast-iron guns can, no doubt, be converted on the Parsons system into very serviceable 6-inch rifled guns, but the Vavasseur 80-pounder, pure and simple, presents many attractive advantages.

In concluding this paper we refer to a statement that we made in our first number of this series, in the May number of The United Service, that in order to arm our navy with guns that can develop the power of any of the formidable pieces that we have been considering, we must have steel; and if our steel is to be of home manufacture there is no time to be lost in concluding to make the demand, so that the supply may be forthcoming. We have never lost sight of this point, which we raised at the outset of this discussion; we may have seemed to wander from it, but the space that we have occupied with seeming digressions, which have brought before us special guns for consideration, has all tended to illustrate the fact, at the foundation of all the systems, that steel is an indispensable element that must be introduced, without which we can do nothing. We see that in the Woolwich and Arm-

strong guns it is considered indispensable for the tubes. The use of it in those guns is injudiciously made, but nothing else will do for the tubes. We see that the French, who have temporized with cast iron and with half tubes of steel, are recognizing the fact that steel must be used as an entirety; and we have seen what Mr. Vavasseur has done with an essentially steel gun. The statements that we have made and the particulars of the different guns quoted ought to carry conviction to all minds without further comment.

Finally, to satisfy the first "want of the navy" in the matter of "cannon" for our unarmored cruisers, we revert to the 6-inch 80-pounder of Mr. Vavasseur as answering our call for a gun from which we can "get the greatest possible amount of work and efficiency out of the least possible weight."

E. Simpson,
Commodore U.S.N.

New London, May, 1880.

HANNIBAL.

"He, above the rest
In shape and nature proudly eminent,
Stood like a tower."

MILTON.

HAMLET, that inexhaustible mine of apt quotations, furnishes two lines which are more appropriate to the great Carthaginian hero than to any other of whom we have authentic information:

"He was a man, take him for all in all,
I shall not look upon his like again."

Substitute for the personal pronoun the phrase "the world," and nothing could be more apposite than this couplet. This "little world of man" can never hope to look upon another Hannibal, because the circumstances and the times in which he appeared and shone are unsusceptible of repetition. Things would have to be resolved back almost into their original chaos or elements before an equal greatness could again become so eminent. He was the grand product of his times,—times not so greatly altered in spite of the vast advance made between the "Dark Ages" which plunged everything back almost into primeval darkness and the "*Renaissance*," until the present, with steam augmenting a thousand-fold the means of transport, and electricity annihilating space in the transmission of intelligence. Shakspeare was indulging the "fine phrenzy" of a poet when he placed in the mouth of Puck the promise and the boast,—

"I'll put a girdle round about the earth
In forty minutes."

The electric telegraph laughs at this, its speed so far surpasses the celerity of the goblin fairy, Oberon's messenger.

Had the Romans possessed any method of telegraphic communication, even the incomprehensible gift of our Western Indians,[1] they

[1] It is said that the Indian method of transmitting intelligence consists of a system of signals based on flashes thrown by mirrors or polished surfaces held in the hollow of the hand and exposed to the sun. If Ossian's poems are authentic, this system of telegraphing by means of heliotropes is at least fifteen hundred years old, for it is alluded to in the Erse manuscripts, which certainly go back to A D. 287,

could have anticipated Hannibal's marches and manœuvres, and rendered them impossible. Had they enjoyed the uses of steam they could have transported armies by sea from one point to another, so as either by the selection of positions or the accumulation of forces to block his routes or crush him. Indeed, it was through the latter proceeding that Hasdrubal was overwhelmed and a period put to Hannibal's triumphs, but not to his victories.

Who was this Hannibal? History answers a Carthaginian, but there she pauses and makes no revelations of his ethnological origin or blood. Was he a Shemite,—another, while a heathen, Joshua, a second irresistible warrior of kindred blood or origin? No portrait exists of him, and a bust furnishes no true data as to complexion or the color of the eyes and hair and the peculiarities of the latter, which distinguish race as much as any other feature. The founders of Carthage were undoubtedly Phœnicians, that is, Semitic; but then it is well known that the city of Dido was a grand commercial centre. A maritime metropolis involves inevitably a mixed population. Carthage was founded B.C. 878; Hannibal was born B.C. 247. Between these dates over six centuries had elapsed. What kind of a population will the great maritime metropolis of America possess between immigration, adoption, and miscegenation, in such a lapse of time? It will be an "*olla podrida*" of bloods. Just such was Carthage. Hannibal had many of the distinguishing marks of an African; not negro in the repulsive sense, for "there are negroes and negroes," and as many varieties among them as differences of color and intelligence. One thing is certain: if he did not have woolly hair, he had close, curling, crispy hair. His family was distinguished. He was the heir to everything involved in the term "position," and the ability and influence of a race of magistrates and heroes, "*noblesse de robe et de l'epée.*" His father was the illustrious Hamilcar Barcas, the latter a pseudonym, signifying "lightning," or the "thunderbolt." His own name means "Grace of Baal," the supreme God. Taking the word "grace" in its widest and grandest signification, it expresses excellence, divine influence, a superlative gift. Bearing in mind the characteristics imputed to Baal, and the ignorance of the Phœnicians as to the grandest attributes of the Deity of the Bible, no human being ever deserved more truly the title of "the grace of the deity" he adored—"the favorite of the supreme Punic god, the Fortune-bringer"—than the child who, at

when the Hollando-British-Roman Emperor Carausius (the Caros of Ossian) made his campaign in Scotland, and built that wonderful monument recently destroyed by an act of vandalism on the banks of the Carron—from a foundry on the shore of which the naval carronade takes its name.

This is the passage in Ossian alluded to:

"High on Cromla's side he sat
Waving the lightning of his sword,
And as he wav'd we mov'd."

nine years of age, swore upon the altar of Baal eternal hatred to Rome, and for a subsequent period of over a quarter of a century of constant and most terrible war, in fact, throughout his life, for sixty years, was the terror of the Romans, "the conquerors of the world."

Three great captains have been assigned to antiquity,—Alexander, Hannibal, and Cæsar; three to modern times,—Gustavus Adolphus, Frederic, and Napoleon. This is a very arbitrary and restricted catalogue. There were many others known entitled to stand on an equal plane with these, and, doubtless, very many that are not generally known, besides those recognized by the critical and learned few. For extent of conquest Alexander does not surpass Sesostris, Ramesis II. There are several Romans who handled armies as well as Cæsar. Gustavus, as a general, was exceeded by his own pupils, especially Torstenson, to whom the epithet of "*Lightning*" was applied,—one common to Hamilcar ("*Baroas*"), Bajazet ("*Ilderim*"), the lion-hearted son of the strong tower of the Thunder God ("*Blixten*"), and Nelson ("*Bronte*").

Frederic, the greatest of all on a restricted theatre, is the "*unique*" (*der Einzige*), as his people hail him, but his wonderful achievements were altogether in the desperate defensive-aggressive. Napoleon is a myth, wonderful alone in his strategy, wherein he pairs off with Alexander. As a grand soldier or captain he is not superior to "the world's victor's victor," Wellington, and, stripped of his imperial plumage, wickedness, and sceptre, is not a more striking example of the power of mind in the individual than Marlborough. So great was the last esteemed by Napoleon that he had a history written of "the handsome Englishman's" campaigns and published by the Imperial Press for the benefit of his armies.

As Alexander preceded Hannibal, he could have expressed no opinion of the latter. Cæsar certainly would find nothing good to say of Rome's greatest enemy, so fearfully misrepresented by all Latin historians. Gustavus Adolphus left no gossipy memoirs. Men were not interviewed in his days.

What did Frederic say?

Napoleon was profuse in his admiration for the genius of Hannibal. "That man," said he, "the most audacious of all, the most astonishing, perhaps; so bold, so *sure*, so comprehensive in all things, who, at the age of twenty-six, conceives that which is hardly conceivable, executes that which might be considered impossible; who, renouncing every communication with his country, traverses inimical or unknown nations which must be assailed and conquered, scales the Pyrenees and the Alps, supposed to be insurmountable, and only descends into Italy that, by the sacrifice of the half of his army, he may obtain the simple acquisition of his chosen field of battle, the sole right to fight; who occupies, traverses, and governs this same Italy during sixteen years, brings that terrible and dreaded Rome several times to the brink of destruc-

tion, and only abandons his prey when the Romans had learned to profit by the lesson which he had taught them, to go and fight him at home,—'to carry the war into Africa.'"[2]

It would seem hardly possible to utter higher praise than this, and yet it is below the deserts of him of whom it is spoken. Napoleon's conqueror (Wellington), when asked by Lord Ellesmere, "Whom he considered on the whole the greatest soldier on record?" answered him and others who propounded the same question, "Hannibal." This opinion of the "Iron Duke" was more comprehensive, as well as correct.

What is strategy? The perfect understanding of the whole theatre of war, its key-points, the objectives, whether this theatre embraces a province, a kingdom, or a continent. It is claimed for Alexander that in Macedon he discerned how and where he must strike for the dominion of the East. Unquestionably he must have derived immense advantages from the travels, explorations, studies, and information of Greeks. They had penetrated wherever he could expect to go or be compelled by force of circumstances to proceed. He had a sure eye. But how much was due to Philip, who made the magnificent army and trained the excellent lieutenants at the disposal of Alexander, is not and never can be known. A remarkable book (Gillies's) has been written to transfer a great deal, if not the greatest share, of the glory of the son to the credit of the father. Concede, however, to the latter all that is attributed to him; still, his preceptor was Aristotle, who embodied pretty much all the reasonable knowledge of his day; his subjects were Greeks, likewise his generals and his troops. He had, for their numbers, the best soldiers in the world, and the hitherto invincible phalanx.

Hannibal was a Phœnician, and the language of his country so restricted that it may be said that scarcely a specimen of its literature exists. Of the outlines of the coasts of the Mediterranean his compatriots knew much. Of the interior of the adjacent countries (Spain, perhaps, excepted), little or nothing. Its army was a mosaic of tribes and nations,—some subjects, some mercenaries, some allies, some adventurers. His camp was "a Babel." It is not absolutely certain that

[2] Whoever studies history closely must every day recognize more clearly the truth of Wordsworth's expression,—

"The world knows nothing of its greatest men."

Memnon, the Rhodian, gave the same strategic counsel when Alexander invaded Asia as that upon which Hannibal acted when he carried the war into Italy, Scipio when he carried the war into Africa, and Napoleon when he imitated Hannibal. Memnon advised the satraps, or generals, of Darius to lay waste the country before the Greeks, burning all the cities, and fall back on stronger positions; or, as Diodorus says, to take ship at once, embark all the troops of the great king, and transfer the war at once into Macedonia. Both counsels, but especially the latter plan, if Memnon conceived the plan, would stamp him as one of the soundest strategists in all military history.

he spoke Greek. He had to communicate with his soldiers through interpreters. Nevertheless, just as clearly as Alexander saw through the medium of others the strategical vitals of the great Asiatic monarchy, Hannibal perceived through his own vision the breach through which he could enter the sacred precincts of Rome. The passage of a narrow sea, and a march through highly-civilized communities which could furnish everything that he needed, brought Alexander at once in contact with his enemy. He acquired strength as he advanced. His first victory was almost decisive of the event.

How was it with Hannibal? In the beginning he had to make his army. Then he had to train it. He was twenty-two when he assumed a general's command as a "general of cavalry," the Arm whose scope and power he comprehended so perfectly and applied so triumphantly. He was twenty-five when he inherited (so to speak) the supreme direction. His first exploit was a siege, one of the most memorable in history. Saguntum taken, thence he saw his way clear to his objective. But between him and it lay no short transit and no beaten road. No civilization intervened, but a march of nearly six hundred miles, as the crow flies, through barbarous foes and unknown dangers. He could count on no certain supplies along the route. Besides this, he had to cross two of the loftiest chains of mountains in the known world, and one of its swiftest and greatest rivers.

Advancing, Alexander grew in strength. Hannibal's numbers were thrice depleted to the extent of half their available force. He had to dispatch a large army to secure the safety of Carthage,—secure it not only against the Romans, but against its own mercenaries and neighbors,—and detach a larger army under his brother Asdrubal to maintain his hold upon Spain, always uncertain, never utterly reliable. To demonstrate the perils he left behind, it should be borne in mind that this was exactly the plan of Austria before its partial dismemberment, holding Italy with Croats, Tzechs, and Magyars, Hungary with Italians; in fact, all doubtful districts with antagonistic races or faithful Austrians proper. Thus, Hannibal sent Spaniards to watch Carthage, and brought Africans to take care of Spain, both at once serving as hostages and soldiers. Astute policy, but what a revelation of the inherent weakness of Carthage and the consolidated power of Rome! When he reached the Pyrenees he dropped out forty-three thousand doubtful, and with only fifty thousand infantry, nine thousand cavalry, and thirty-seven elephants, he traversed Gaul, deceived the ablest Roman generals watching his every movement, crossed the Rhone, fought his way across the Alps, triumphed over nature, conquered the bold and hardy mountaineers who disputed every defensible point, and descended into Italy. Marvel of marvels! Fact undisputed and unparalleled, he encamped upon the plains drained by the Po with a remnant of about twenty thousand infantry—of whom twelve thousand were Africans and about eight

thousand, the best, were Spaniards—and six thousand cavalry to assail a power which could put seven hundred and sixty-eight thousand (I. ii. 161) more or less trained soldiers in line of battle. To compare the passage of the Alps by Napoleon, in 1800, with that of Hannibal, B.C. 218, is to contrast a pyramid with the highest peak of the Himalayas. Let any competent judge weigh the strategy of Alexander or of Napoleon, under existing circumstances, with that of Hannibal, and the conception of either of the two former is a mere application of knowledge to known conditions when contrasted with that of the latter, which was military genius in the grandest and vastest and truest signification of the gift.

Drop the parallelism with Alexander and Napoleon and consider another,—with Cæsar. Cæsar tells his own story. Hannibal had almost his whole story told by enemies. Cæsar, with the best troops of his day, perfect in tactics, equipments, everything connected with the art and science of war, encountered barbarians almost as deficient in means as his army was perfect. No comparison can be instituted except in bravery. Cæsar conquered Gaul. Did he conquer the country which is now known as the kingdom of the Netherlands? He says he did. This is very doubtful. It is still more doubtful if he was not worsted in Britain; that he was not glad to quit the island while he could still extricate himself with a *show* of success. He did not make his army. It had been made by centuries of adoption, adaptation, training. Vegetius says that "the tactics of the Romans must have been the direct inspiration of a God." The Legion was the perfection of ancient organization, of the highest application of armed force by the most military experts through centuries. It outlasted as a successful war-engine the very manliness of the race that conceived it. The name and the form existed as a terror when the soul had departed. Cæsar's army was homogeneous. Every man who fought under his standards "touched elbow" through brotherhood, language, discipline, and patriotism. The army of Hannibal was heterogeneous to a degree without a precedent and without a subsequent example. Of the army which he made and led out of Spain more than one-half had perished before it encountered the enemy it set out to meet. It had to be remade again and again under the eyes and the missiles of his antagonists. He had to reconstitute it out of the most discordant materials, not once, but almost as many times as he remained years—sixteen (B.C. 218–203)—on foeman's soil. He had to capture the weapons with which he re-armed it. He had to assimilate his tactics to the weapons he wrenched from the slaughtered and the captured. Without magazines, he had to feed the troops which annihilated army after army, fed and supplied from magazines and arsenals at hand, and a remoter invulnerable centre. The blood of the Romans that he slew was sufficient to have drowned out the comparative handfuls that slaughtered if there had been no conduits to lead off the blood.

I here say that "the Romans must have lost in Italy alone one hundred and twenty thousand men actually slain or taken prisoners (of the latter very few were suffered to live), without reckoning those who succumbed to disease and the fatigues and privations of the prolonged campaigns" of (B.C. 218–216) "hardly two years." According to a comparative military medical calculation the war had cost of Romans twelve to twenty times as many citizens as Hannibal led soldiers into Italy. "We may certainly assume (Ihne, 1871, ii. 473) that the Hannibalian war cost Italy a million of lives." Nevertheless, Hannibal for over sixteen years ranged through Italy without losing a battle, triumphant on every stricken field, and left it only in obedience to the summons of his native country, master of the ground he occupied until his last man had entered the boats which were to convey them to the homeward-bound transports. And yet through all the vicissitudes, the strain, the privations, the desperate circumstances, at times the very despair of these sixteen or seventeen unparalleled years; amid these continually renewed hosts of strangers, unsympathetic, devoid of all ties of patriotism, speaking unknown tongues to their chief and to each other, there never was a hand raised against Hannibal. His foulest enemies admit this fact. There were conspiracies against Alexander and against Napoleon. Conspirators slew Cæsar. Traitors manifested themselves among the very ones delivered by Frederic. According to Oxenstiern a traitor killed Gustavus. And yet among the unreliable Spaniards, the fickle Gauls, the wild Numidians, the incoherent tribes of Italy, the cruel Carthaginians, the one-eyed Hannibal walked and slept and led and directed and enforced a discipline of iron as safely, as beloved, as honored, as obeyed, as if he had been a very god manifesting himself to an adoring multitude of votaries.

It has been charged against him that he failed in sieges. The inexplicable and almost inconceivable will-power and influence of a man, however mighty, is totally inoperative against inert matter. To batter down a wall requires suitable engines. It is not known whether Hannibal brought any of these from Spain. If he had, they were unsusceptible of transport into Italy. If he had brought them to the foot of the Alps, he must have left them there. Always moving and fighting, if he did not drag them along, he had no time to construct them. He had no materials, and no arsenals whence to derive these; no trained mechanics, and no opportunity to train any. The scientific corps of an army are the production of the time and arts of peace. Hannibal's campaigns were perfect realizations of the touching motto of the French soldier in Algiers,—"To fight and to suffer." Sieges require experience, instruction, and science in inferiors. A general can, through himself infused into his army, win a battle. But the power of man ceases when army "material" has to be created and applied by means which do not exist and cannot be evolved by any amount of enthusiasm

or heroism. A witty French general (Nansouty?), when blamed for the miserable condition of his cavalry mounts in Russia, answered, "Horses have no patriotism. You cannot appeal to their enthusiasm; they only respond to oats!" No genius to-day can found ordnance! Finally, to dismiss this only objection to Hannibal's supreme genius, let it be borne in mind that a brilliant writer and classical scholar of eminent merit declared that it "seems to be doubtful" "if the Carthaginians knew the use" of military engines; that even if they did, and Hannibal had them in Spain, he "was unable to carry any with him"; and that "to his weakness in this Arm the failure of his ultimate attempts against Rome is, I believe, wholly to be attributed."

Or, to make this still clearer, man can overcome his fellow-men, but not nature. Thus, Hannibal, who continued in Italy unconquered for sixteen years (B.C. 218–203), had to succumb to the winter and inundations in the Appenines and Etruria in the winter B.C. 216–17. In this attempt to relieve Cisalpine Gaul of the burden of supporting his army he lost all his surviving elephants but one, and also one of his own eyes.

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To present a detailed narrative of the various occurrences comprised in the campaigns of Hannibal would require a volume. Suffice it to say that Hannibal moved at pleasure throughout Southern Italy, defeating every Roman general with whom he came in contact, although he only received one reinforcement from Carthage.

The fate of Rome was yet undecided in the eleventh campaign. The scale weighted with its fortunes scarcely maintained the counterpoise against the one charged with the genius of Hannibal. The latter (B.C. 207) was only awaiting the arrival of his brother Hasdrubal to depress the balance forever against Rome. Hasdrubal came, following the Alpine route, which his greater brother had already, to the astonishment of the world, explored. The brothers were never destined to meet in life. On the Metaurus Hasdrubal was overwhelmed, his army destroyed, and himself slain. Creasy considers this conflict the "fourth" of the "fifteen decisive battles of the world," and it is truly worthy of the distinction.

Truth is said to be stranger than fiction, and romance often clothes itself in a costume even less *bizarre* than reality. It was so in this case. Hannibal was near Canusium, not far from the stage of his greatest tactical triumph,—Cannæ. His outposts were in contact with those of the Romans. In front of him was the army of the consul, Nero. Suddenly, just as Torstenson disappeared from before Gallas to dart across Germany to the conquest of Denmark, just so the legions of Nero vanished. They had flown to reinforce the other consul, Livius, two hundred and fifty miles to the northward, on the Metaurus. Hasdrubal recognized the junction by the double consular trumpet signals in the augmented array before him. Supposing that such a reinforcement of

the enemy would have been impossible, except that Hannibal had been defeated or slain, he accepted the inevitable combat with a full realization of the impending fatal result, and literally "foremost, fighting, fell."

It is scarcely possible that the light troops, whose efficiency had been of such assistance to Hannibal in his earlier campaigns, could still have been equally reliable if they allowed Nero's legions to vanish thus from before them. Doubtless his Numidian horses had long since perished, and their riders, never recruited, had dwindled in numbers and grown stiff with unremitting labors, diseases, wounds, and the many hardships of unceasing active service. At all events, the first knowledge of the overthrow of his brother, of his own hopes, and of the supremacy of his country was announced by a brutal act common to Romans, and the very Romans who perpetrated such savageries charged them, falsely, upon Hannibal, because the cruel always judge their opponents by themselves.

The story of Rome's brutality is variously told. Either the severed head of Hasdrubal was cast down by the Romans before the feet of his great brother's pickets or vedettes, or it was tossed into his lines.

"When Hannibal recognized the bloody head of his brother he foresaw [comprehended or recognized] the fate of Carthage." Arnold remarks on this: "He had not dealt so with the remains of the Roman generals: but of this Nero recked nothing; as indifferent to justice and humanity in his dealings with an enemy as his imperial descendants showed themselves towards Rome and all mankind."

Hannibal now retreated into Bruttium, the foot of the boot to which Italy has been likened, the projection from Tarento towards Otranto constituting the heel. "For four years longer he clung with astounding tenacity to the soil," says Ihne, "and for all this time his name and his unconquered arms continued to strike terror throughout Italy."

It is scarcely possible to convey to modern readers any commensurate idea of such a condition of things. Bruttium is the modern Calabria. It is two hundred miles long, north and south, and except to the north it is surrounded by the sea. It is a peninsula very much like Florida, only less than two-thirds the length of the latter, and whereas Florida is flat, Bruttium is exceedingly mountainous.

In order to estimate the immense superiority of Hannibal to his antagonists, let the reader imagine an enemy, under thirty thousand strong, in possession of the Eastern Shore of Maryland and the rest of this peninsula (provided it was rugged and mountainous instead of the contrary), and these invaders capable of maintaining themselves for four years against all the neighboring States in next to full possession of the sea. What is more, how long Hannibal could have continued thus to hold out against the whole power of Rome in this single province was never demonstrated, since he abandoned it while his enemies still stood aghast before his mighty presence.

The common world are so incapable of judging of really great men that whoever undertakes to present the simple truth regarding them, to obtain a patient hearing, is compelled to strengthen the simplest narration with the multiplied buttresses of authorities. These, in this case, might have been piled like Pelion upon Ossa, had space been conceded.

Henry William Herbert was a classical scholar of the highest ability, although he is known to but few otherwise than through his works in the most different lines,—Sporting and Treatises for Sportsmen. He wrote the lives of the "Captains of the Old World," and in that of Hannibal he makes the following observation in this connection: "Before he was recalled to fight at home for the very existence of Carthage, he had maintained himself for seventeen years in the heart of an enemy's country, without reinforcements, supplies, or moneys, except what he took from the enemy; he had traversed and retraversed every portion of the peninsula, from the Po to the Gulf of Tarentum, wasting it with fire and sword at his own will; he had won three pitched battles, which are to this day the admiration of all strategists; he had beaten every force that ever met him in the field; he had never suffered a defeat; and when he withdrew from the shores of Italy, he did so, not that the Romans drove him thence, but that Carthage needed him elsewhere."

Of him might be uttered in its grandest sense the boast which Shakspeare puts in the mouth of Coriolanus:

> "False hound!
> If you have writ your annals true, 'tis there,
> That, like an eagle in a dove-cote, I
> Flutter'd your Volscians [Romans] in Corioli [Italy]:
> Alone I did it."

* * * * * * * *

A judgment has been attributed to Gustavus Adolphus which was exemplified in the career of Hannibal. "The Swede," "the greatest man of all this modern world," is said to have expressed the opinion that he never wanted to command an army of more than fifty thousand men,—veterans or highly-disciplined troops with good officers,—for three or more reasons: 1st, because with this number he could so manœuvre that no antagonists, however numerous, could force him to fight against his will; 2d, with this force he could select such a position to fight that no ordinary preponderance of numbers could compensate for the advantage of a defensive-aggressive on chosen ground, since an army like the one he mentioned must inevitably comprise inferior troops, which were a detriment rather than a benefit in a vast majority of instances; 3d, it was almost impossible to feed more than fifty thousand,—prior to the introduction of railroads and other recent inventions,—and as "an army goes on its belly," according to Frederic the Great, the necessity of providing and transporting provisions and

ammunition greatly depreciated the mobility, and rendered sudden movements, especially to a distance, impossible.

It is curious to note that neither Gustavus nor his successors ever fought a pitched battle with anything like fifty thousand men. Frederic's greatest victories were achieved with far less than fifty thousand men, and Hannibal had less than thirty thousand at Trebbia, about forty thousand at Thrasymene, and exactly fifty thousand at Cannæ, where, with a loss of six thousand, he slaughtered eighty thousand Romans out of a total of ninety thousand, of whom only a few escaped in any way.

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Although Hannibal was absolutely destroying Italy, the Romans, even under these circumstances, would not have fought the battle of Cannæ if it had not been indispensable. Even then it was precipitated by one of those leaders so greatly admired by the unreflecting masses,—a leader who possesses simply brute courage, and does not fear to risk his own life, and consequently, through sheer temerity, is utterly regardless of the lives of those committed to his charge. Varro, the son of a butcher,—by some claimed to have been a butcher himself,—was the sole occasion of this butchery. With all his faults, there was something grand in his destitution of fear. Surviving the catastrophe he had occasioned, he did not lose hope, and is better known, perhaps, through the vote of confidence passed by the Roman Senate than by name or actions. He was thanked because, even after the loss of such a battle as Cannæ,—2d August, B.C. 216,—he "did not despair of the commonwealth." Such confidence in himself and in his nation was the real source of the ultimate triumph of Rome. Colonel von Kausler is perhaps the best authority on the battles of which he has treated in his famous work. He only abates by twenty-eight hundred the ninety thousand Romans generally stated to have taken part in this battle. Of these, eighty thousand were infantry, seventy-two hundred to ten thousand horsemen. No writer ventures to assign to Hannibal more than forty thousand infantry and ten thousand cavalry. Conceding that a legion of this era consisted of five thousand men, Varro drew up his whole infantry—equal to (Macdougall's Hannibal, p. 8) four consular commands—in a vast column of legions, an enormous block of men, the oldest troops in front, and the newest levies in the rear, with the cavalry on the wings,—the Roman horse, proper, on the right, those of the Latin allies on the left.

Hannibal was as much renowned for his stratagem as for his strategy. Very many people confound the two, but never were there two words of more different primary significations. Strategy carried Hannibal into Italy. Stratagem won almost every one of his successes. The first is science-and-art generalship, the second artifice in all its various tricks and applications. War at best is the devil's game. He

is the father of lies, and deception has more to do with success in war than anything else, than its prime necessities,—money and men.

Hannibal's plan for bringing on and fighting the battle of Cannæ was nothing more than a series of lesser and greater stratagems. To use a vulgar but pertinent expression, he twisted Varro around his little finger.

So as not to be outflanked by the nearly two to one of the enemy, Hannibal rested either flank on the Aufidus, which here forms quite a bow. Like his adversary, he placed his cavalry on the wings, but he opposed his best and heavy horsemen on his left to the Roman knights constituting their right, and his Numidians and Lybians on his opposite wing—the right—to the inferior cavalry of the Latin allies. His line of battle was remarkable, and hard to explain without a plan. It was concave on the whole, with a convex projection, or bulge, in the centre. He hoped by thus thrusting out his centre he would attract to it the force of the Roman attack, and by concentrating the fighting at this point find in it some compensation for the inferiority of his numbers and the scantiness of his front. The Roman general, Varro, fell completely into the trap. He advanced like a bull against a matador; and with the success of this artifice, founded on Hannibal's comprehension of the stupidity of his adversary, the battle began.

Moderns conceive that all "the pomp and circumstance of glorious war" is the growth of only a comparatively short period. They are greatly mistaken. When the Grecian phalanx moved the field of exercise seemed to be ablaze with crimson and gold, since their uniforms were red and their arms and accoutrements brass or of brazen mounting. Nor was the Roman army less magnificent to look upon; and when, on festivals, the troops took all the coverings off their metal armor, and the sun fell upon the manœuvring masses of spotless steel and brass, they seemed to be moving in the blaze of their own light.

Nor were the Punic arms, attire, and accoutrements less superb and striking. Nicol says of Hannibal's entrance into Capua:

> "Through the shouting streets
> With laurels strewn, the Punic splendor passed;
> All hues and shapes of men and horse attired
> In various blazonries—a rainbow thrown
> Into a moving mass The General's guard
> Flowed like a stream of gold through ranks of steel;
> He, girt by armor-bearers, from his eye
> Flung round a lustre making pale the gems
> That glittered on his Casque."

Hennebért justifies this imagery, and also Silius Italicus.

There are some magnificent accounts of this battle of Cannæ, but it is impossible to linger upon them. Some features, however, cannot be neglected. Tall plumes rose above the helmets of the Roman infantry,

and as their eighty thousand advanced under the August sun it lit up a waving forest of red and black foliage, through which flashed the reflection from a sea of brazen helmets. On the other side, the Spanish veterans were conspicuous in white heavily edged with crimson. The Gallic Celts fought stripped to the waist. Every nationality appeared in its particular fashion, and over all dominated the magnificent Spanish and Gaulish cuirassier-lancers, covered with metal, above them towering their long and massive spears, all of which made them seem like giants upon their powerful chargers. Meanwhile, the famous Numidian horse must have resembled swarms of barbarians fully as wild as our Western Indians, without the latter's childish display and neglect of the faithful animals that bore them. The Africans, on the contrary, devoted as much (if not more) care to their horses as to themselves. They anointed their wounds and bruises with as much anxiety as their own, and washed them all over after any unusual exertions,—not with the poorest, but with the best and oldest, of the captured wine. The Spanish and Gaulish cuirassier-lancers, under Hasdrubal, soon disposed of everything in their front, and chased off the Roman knights along the river, following them up till they were almost destroyed. Then they galloped off to the right, to the assistance of the Numidians, who were skirmishing with the horse furnished by the Latin allies. As soon as the cuirassier-lancers made their appearance these broke in panic and fled. This afforded mere sword's play for the Numidians, and the fugitive cavaliers were soon converted into corpses before their flight had continued any distance.

By this time the Romans supposed that they had forced back Hannibal's centre and pierced his line, whereas it had simply drawn back, in obedience to orders, to entice them the deeper into the snare. All at once, upon order, the Carthaginian centre halted and stood fast, and their brother-warriors on the wings closed in upon the flanks of the Roman column. Thus the Romans, contracted into a seething mass so close that many must have perished from pressure or been suffocated by the heat and stifling atmosphere, were inclosed on three sides. Recall that it was stated that the poorest of the legionaries were in the rear, and it was upon them that the stormy charge of Hasdrubal's victorious heavy cavalry burst in all its fury. "Then followed a butchery such as has no recorded equal, except the slaughter of the Persians in their camp when the Greeks forced it after the battle of Platæa. Unable to fight or fly, with no quarter asked or given, the Romans and Italians fell before the swords of their enemies, till, when the sun set upon the field, there were left out of that vast multitude no more than three thousand men alive and unwounded, and these fled in straggling parties, under cover of the darkness, and found a refuge in the neighboring towns." Arnold is considered the best authority, and these are his words. Von Kausler states, as the result of the battle, that forty-five

thousand foot and three thousand seven hundred horsemen, with one consul, Paulus Æmilius, two quæstors, twenty-one tribunes, and eighty senators, fell on the field. Of the whole of the Roman army only about four thousand escaped. Thus the soldier coincides in effect with the civilian historian.

Hannibal did not lose over six thousand, but it was a loss of veterans that nothing could repair.

The cause of this catastrophe, "which brought Rome to the brink of the precipice" of ruin,—the Consul Varro,—as usual with his class, escaped.

Von Kausler attributes the loss of the battle to four causes: (1) Varro's too good opinion of himself and too little of his enemies, whom he foolishly despised on account of their inferiority of number; (2) the ardor with which he thrust himself into the trap which had been set for him, even after his right flank was entirely uncovered by the destruction of the Roman cavalry; (3) the Roman contraction or ployment, which enabled the Carthaginians, although fewer in number, by a wider deployment to envelop him; (4) the indefensible order or blunder which caused the Roman cavalry to dismount, whereby they were ruined.

Only one single military reflection will be indulged in. Ought, or ought not, Hannibal to have marched against Rome itself after Cannæ? Perhaps no question on earth has been more ably or frequently debated than this. The language used to him by his general of horse, Maharbal, is not disputed, except as to the words; its purport is conceded. "If," said Maharbal, "you will let me lead the horse forthwith, and follow quickly [*i.e.*, with the infantry], you shall dine on the Capitol in five days."

The vast majority decide that if "the GREATEST CAPTAIN, without exception, whom this world has yet seen, or perhaps will see forever," decided not to march on Rome, "the best cavalry officer of the first cavalry service in the world" was wrong in his advice.

The writer sides with Maharbal.[3]

[3] Lanfrey, in his Napoleon I. (v. 21), justly remarks of the Archduke Charles in 1809, after his success on the 21-22 May, which should have inspired him to renewed exertion: "At Essling, the Archduke had re-established himself in his own eyes and those of his [the Austrian] army; but instead of deriving from this success greater confidence and activity to undertake more, he esteemed himself happy in having gained such an advantage over an adversary who inspired him with intense admiration, and he trembled lest he should compromise his success by too much audacity." In Hannibal's case it was not any Roman general or army restrained him, but the indomitable spirit of Rome, as a people.

Scanderbeg spoke in a different but the right key to Huniades, when he said, "It is a bold measure, but Success is the child of Audacity."

How well Shakspeare expresses the danger of irresolution which has slain so many of man's greatest enterprises in the very conception: "Letting I dare not wait upon I would!"

If Hannibal had failed then, he would only have forestalled his ultimate failure, and all ages would have applauded such a magnificent attempt, all time endorsed such a heroic decision.

After Leipsic, 1632, Oxenstiern, as sagacious a man and statesman —a soldier likewise of no mean ability—as ever lived, blamed Gustavus Adolphus for not marching straight on Vienna, but the latter, however full of spirit himself, argued like Hannibal, while his colder-blooded chancellor reasoned like Maharbal. Charles V. blamed Philip II., under similar circumstances, for not marching at once on Paris after St. Quentin, 10th August, 1557,—a victory which originated the Escurial as a memorial.

Charles, Duke of Bourbon, took Rome with his horde of adventurers under more desperate circumstances on the 6th May, 1527.

The Earl of Peterborough captured Barcelona by a similar stroke of daring in September–October, 1705.

Examples might be multiplied. If Napoleon had reasoned like Hannibal, he would not have compelled the Peace of Campo Formio, 1797; Presburg, 1805; or Vienna, 1809.

The principle advocated by Maharbal carried Wellington and Blücher on the wings of the victory of Waterloo to Paris in 1815.

Audacity has achieved greater results than all the other human forces, single or combined; and when Danton was asked what alone was necessary to the success of the French republic, he gave the solution in his answer of six words: "Audacity! more Audacity!! still more Audacity!!!" This idea carried the tricolor into almost every capital of continental Europe.

This not marching on Rome after Cannæ seems the only weak spot in the character, and the only injustice to himself in the career, of Hannibal. Arnold, as a Christian philosopher, finds the only valid excuse for him: God did not will it to be so! The designs of Providence seemed to require the ultimate triumph of Rome, because the success of Carthage was incompatible with the future stable healthy advancement and development of humanity.

The policy of Carthage was not more intrinsically cruel than that of Rome, but then it was intensely selfish; whereas Roman extension, although scarcely less selfish, was sufficiently politic not to sacrifice everything to Roman aggrandizement without accomplishing a certain diffusion of advantages, without which, humanly speaking, there was no possibility of the rise, increment, and influence of the New Dispensation, which was disseminated along the same routes built to facilitate the march of the legions to universal dominion, which thus unintentionally became the avenues for the conveyance of the glad tidings of the gospel of Everlasting Peace.

The greatness of individuals can only be made clearly apparent to men by presenting comparisons and contrasting their exploits.

Allusion has been made again and again to the six commanders who are, as a rule, assigned to the first class. Of these, the first three, belonging to antiquity, have been justly styled adventurers or *condottieri* on the grandest scale. Alexander was a royal "adventurer." Hannibal was a patriotic *condottierie*. Cæsar was a selfish example of the first. Of the three moderns, Gustavus was a patriot, a combination of Judas Maccabeus and Joshua. Frederic was the champion of his country. Napoleon, the modern Attila, another "Scourge of God."

Hannibal accomplished more with less means than either of the other five, and only failed in effecting all that he undertook to accomplish because his means failed. When Ney asked for more cavalry at Waterloo, after those which had been intrusted to him had been wasted on the English "squares," Napoleon cried, "Where am I to get them? Does he expect me to make them?" For Hannibal to have done more than he did he would have had to possess a creative power not only as to men or soldiers, but material and money to buy and maintain both.

Alexander, who started with the reservation to himself and as his sole reward and share of the expected booty the fulfillment of his "Hopes," was the absolute monarch of the first people of the world as it then was, having at his disposition an army which in preparation, efficiency, and officers was as perfect as the times permitted. Great as the world esteems Alexander to have been, he had a greater father, who had prepared everything to his hand in the same way that the great Egyptian conqueror owed the organization of his army to his parent. Alexander inherited a perfectly homogeneous "armada." He lacked nothing requisite for success. Everything was ready to his hand. He commenced his career as a royal "adventurer" at the age of twenty-one, B.C. 335, and it was accomplished in twelve years, B.C. 323. He fought with Greeks against barbarians, effeminate inferiors, and for a time a timid adversary. His principal enemies—*i.e.*, the Persians—were nations whom the Greeks despised, whom they had defeated under every disadvantage, ever since, indeed, they came in contact with them, for over two centuries. Even the whole of these twelve years of independent command and conquest were not all truceless wars. There were lulls and pauses.

Julius Cæsar received his first command-in-chief B.C. 59–58, at the age of forty-eight, and was assassinated B.C. 44. His opponents, however brave, were in many cases so badly armed, it is stated, that very often after a Gaul made a heavy stroke with his sword he had to bend down to straighten the blade with his foot before he could repeat the cut. Some of Cæsar's achievements already, in the light of modern critical investigation, are resolving themselves into myths. Moreover, the Gauls and Belgæ and Germans and Britons had no historians; and subsequent times have to rely upon Cæsar's own story. Nothing like the whole of Cæsar's activity as a general, covering a period of

fourteen years, was continuous warfare. He enjoyed long and frequent breathing-spells. Remember, he commanded Rome's invincible legions.

Gustavus Adolphus succeeded to the throne in 1611, aged seventeen. He began to fight as soon as he was crowned, and he was killed in battle in 1632. This would apparently give him a military career of about twenty-one years. Of these the world only fixes its attention upon his campaigns in Germany, lasting only a few days over two years and four months. All his first campaigns were directed against semi-barbarians. He made only two against generals of ability. He fought at most four pitched battles, and he fell in the last, leaving the event undecided. Unlike Alexander and Cæsar, his greatest triumphs were over generals and troops worthy to measure brains and swords with him.

One of the Swedish generalissimos who succeeded him, Torstenson, whose crowning battle has been treated in a former number of THE UNITED SERVICE,—the pupil of Gustavus in one sense of the word, his rival or master in another,—is said to have come nearest of any great captain of whom there are reliable records, and under every aspect, to Hannibal. Still, although Torstenson displayed first-class talent even while a youth then rising grade by grade, and genius as chief of the new artillery arm and as second in command, his functions as commander-in-chief of armies were limited to less than four years, very much resembling, however, even as to details, the best phase of Hannibal's life from the Ticino to Herdonea.

Frederic the Great, take him all in all, and judge him justly, was perhaps the most remarkable king who has ever lived. Like Alexander, he was at once king and commander, his own prime minister,—in fact, his whole ministry combined, "the One" and "the Nonpareil." He underwent about as much rough campaigning as any sovereign who ever united the functions of absolute sovereign, absolute administrator, and absolute general. Nevertheless, although the king fought from the beginning about as one to six, his real fighting did not occupy fully ten of the forty-six years of his reign. He commanded in seventeen pitched battles, and was victorious in eleven; abandoned his first field, and was nearly ruined in two. Several of his victories were certainly equal to the best of Hannibal's. But the Carthaginian never lost a battle in Italy, nor any battle while he had the army he forged and annealed. He lost his last, Zama, but through no error of his own. His instruments were unequal to his requirements, the demands of the hour, and the circumstances. Everything had changed but Hannibal. Frederic overcame difficulties as great as beset Hannibal; but then he was a king fighting on his own soil, backed by a brave and hardy people into whom he had infused his own indomitable spirit. Moreover, his army was superior to that of any other civilized power. Hannibal was neither a king nor independent of home interference. He had a het-

erogeneous army of mercenaries, to whom he gave better arms and tactics as he won the one and learned the other. He descended into Italy with twenty-six thousand men to encounter Rome, the first war-power of the world, which could place in the field seven hundred and sixty-eight thousand more or less trained citizens fit for military service. Frederic had seaports, fortresses, arsenals, magazines, accumulated funds, and even allies; also food ready to the hand for his men's mouths, and food for the mouths of their guns. Hannibal had neither. All the advantages he possessed were in his own brain and in his own heart, whichever is the seat of capacity and courage. As before said, Frederic underwent more hardships than any other crowned generalissimo, but nothing in comparison to Hannibal, who lost one of his eyes through exposure, and for fifteen years afterwards with such a defective vision, at a time when battles were necessarily under the immediate supervision of the commanding general, continued to

"Ride in the whirlwind and direct the storm."

Napoleon Bonaparte received the command of the army of Italy in February, 1796,—an army which had won at Loano (1795) a victory worthy to rank with his best,—"an army which, to cite a famous comparison, was a weapon that would cut of itself, would cut in any hands." His first phase of command of eighteen months was certainly wonderful, but in the accounts of it there is a great deal of the mythical mingled with the reality. He did not lead, as so often represented, flag in hand, across the bridge of Lodi. He did have moments of utter feebleness. His first Peace—Campo Formio—was opportune, and due almost as much, if not more, to the magnanimity of Moreau and of the army of the Rhine as to himself and his own. His second campaign of Egypt and Syria was chiefly against opponents whom it was scarcely any credit for European veterans to conquer. The moment that he ran against brute courage, directed by European science and backed by British civilization, he made a failure, and it was a terrible one. His next campaign—of 1800—was decided by one battle,—Marengo, a victory over the Austrians, whose lot in military history seems that of being beaten when opposed to anything like an equal antagonist. Marengo narrowly shaved a defeat, and was not more brilliant than the Hohenlinden of Moreau, or the Heliopolis of Kleber, or the Trebbia of Hannibal, if, indeed, as glorious. The Carthaginian crossed the Alps to his victory, —a passage to which that of Napoleon's was child's play; yes, child's play even to the simultaneous passage of the Splugen by Macdonald, or that of the Ore Mountains, prior to Janikau, by Torstenson, in the warfare of 1744–45, or to the crossing of the Apennines by Hannibal, B.C. 218.

As yet Napoleon had not, honestly comparing, won a victory to rank with the first three of Hannibal, nor with the Rosbach or

the Leuthen of Frederic, and he never did, for he had passed his apogee. In 1804 he became emperor, and in 1815 he was sent to St. Helena. Out of these eleven years he was fighting about half the time. Napoleon's campaign of 1805 would have been remarkable against equals, but in this again he was pitted against Austrians under an imbecile. If Austria had backed up Russia, Austerlitz need not have decided the campaign. The humiliation of Prussia in 1806 was due to the senility of its military heads. The decisive share of the twin victory, however, was not won by Napoleon at Jena, but by Davoust at Auerstadt. In 1807 Napoleon was worsted at Eylau and on the brink of ruin, and again after Aspern, in 1809. He lost his army in Russia in 1812; and another army at Leipsic in 1813. In 1814 he first commenced to play the losing game which Frederic played successfully for six years, and Hannibal for fifteen years. In three months Napoleon's fate was settled, and he was sent to Elba. In 1815 he had another chance, with an army certainly as good as he had ever previously led into the field, if it was not better; and even critical military and historical writers are beginning to see that the Waterloo campaign was a blunder as to execution. Napoleon was disastrously defeated on two occasions, twice worsted. Hannibal was never worsted, and never defeated as long as he was on Roman ground at the head of the army he himself had made. Although we have no Carthaginian, no friendly or unbiased account, or even a complete Greek history, even the purely Roman accounts do not demonstrate that any Roman general gained any success in the open field over him on Italian ground. Even the bloody, treacherous Marcellus, the "Sword of Rome," let Hannibal severely alone. As soon as Marcellus came within striking distance he perished. Napoleon, with modern science and artillery, failed in the only siege he ever undertook. Hannibal failed in sieges because he had neither the machines which represented artillery, nor the artificers to construct them; and besides lacked a scientific corps to work them.

Hannibal was not only a great soldier in every branch of the military art and science, but he was a great citizen. He excelled as much in the arts of peace as in the arts of war. He was as marvelous in the Senate and in the city as in the saddle and in the camp; and whether as a general, a statesman, an exile, or a fugitive, he was equally the terror of Rome.

Modern critical historians like Ferguson, Arnold, Michelet, Mommsen, Niebuhr, and Ihne, who have resolved so much of Roman history back into fable which the past generation were taught to believe in implicitly as fixed fact, have likewise dispelled the mists of falsehood with which the Romans invested the character and career of their greatest enemy, and revealed both in greater brilliancy. Niebuhr exhausts himself in tender praise, and the Christian historian Arnold attributes the salvation of Rome to Providence alone. Without the direct interposi-

tion of Providence he admits that the bloody city must have succumbed to the genius of Hannibal. Nor is he alone in this view. Various writers come to the same conclusion, with merely a change in their mode of expression.

There was an astuteness, a cunning, or a sagacity about Hannibal which seemed superhuman. Epaminondas won the two victories which have immortalized his name by an application of the same manœuvre in which Frederic excelled. With Frederic it was pretty much the same way. The tactics with which Hannibal won each one of his victories—victories which in succession obliterated an army—were utterly distinct and different. The Trebbia was the fruit of stratagem and consummate comprehension of national character; Thrasymene, of position and natural circumstances; Cannæ, of superlative tactical manœuvre. Such another battle as Cannæ was never fought on the face of this earth, and never, perhaps, will be fought again until another Hannibal arises to make another army capable of putting such ideas as his into execution amid deluges of blood and amid a whirlwind of missiles. There were three phases at Cannæ, all equally well done. Curious to say, our George H. Thomas applied the principle developed in the first at Nashville, and in the third at Mill Spring. There is no second example on record of the successful application of all three combined. Chattanooga, the result of unforeseen combinations of accidents, might afford some resemblance if a soldier's mind were applied to the assimilation.

Looking at battles, and weighing one against the other, there are very few which can compare with those won by Hannibal. He never fought one fairly and squarely without eliminating an army from the war problem; and perhaps there never was a commander whose victories were such complete catastrophes to the enemy. Throughout the "Slaveholders' Rebellion," or "Great American Conflict," there was but one battle—Nashville—which in its results rises to the dignity of decisive as far as involves the destruction or dissolution of an opposing force. Even with this commendation, it cannot be classed with the Rosbach and Leuthen of Frederic, gained against tremendous odds, or these latter with the Trebbia, Thrasymene, and Cannæ of Hannibal. Frederic's opponents were inferiors in one sense or another; Hannibal's, superiors in all but the commanding general and his lieutenants.

Although there are a multitude of books devoted to the consideration of Hannibal and his exploits, the whole are nothing more than mere presentations of the same bare facts, regarded from different stand-points as affected by the clearer lights of circumstantial evidence and a better knowledge of geography and contemporaneous history. Polybius is the only reliable authority, and after Cannæ, 2d August, B.C. 216, the accounts which have come down to us are mere fragments of what he originally wrote. He was a Greek, and therefore comparatively

devoid of prejudice; and he was already born before the career of Hannibal had closed. The Roman histories are utterly unreliable, even devoid of a basis of truth. They were prepared to excuse the humiliation of their country, and written centuries subsequent to the events of which they treated. They transmuted defeats into victories, especially those of Marcellus, to glorify a powerful Roman *gens*, and the best critics have now come to the conclusion that the Consul Nero, to whom is attributed the defeat of Hasdrubal, was not entitled to the glory, and it was only allotted to him, about three centuries after, to flatter his namesake, the vile emperor Nero, who was a contemporary of Livy, the historian. Ihne, the most careful of the modern historians, and who has published within ten years, assures us, after Polybius fails us by reason of the fragmentary nature of his literary remains, that Hannibal's strategy in the last years of the war was as superlative as in the beginning; "that at no [other] period does the generalship of Hannibal appear in a more brilliant light" (ii. 442).

Arnold corroborates this. He says, "The Roman writers have recorded victories over Hannibal too mendacious for themselves to believe." Ihne styles him the irresistible conqueror whom no Roman general ventured to encounter (ii. 337); that wherever he appeared the Romans slunk back into their hiding-places; that, as at Cannæ, his subsequent victories were slaughters of his enemies; that the very name of Hannibal filled Rome with affright.

That Scipio won a victory over Hannibal at Zama is incontestable, but under circumstances completely reversed. The Roman infantry were veterans burning to avenge seventeen years of disgrace, supported by the very cavalry which gave them the victory that rendered the Carthaginian first the general of cavalry, and then the commander-in-chief invincible while seconded by Maharbal—"the best cavalry officer of the finest cavalry service in the world (A. 496)—and Hasdrubal, who managed the commissariat of the army for so many years in an enemy's country." To fight at Zama, Hannibal had "scraped together"—to use the terse expression of a German military historian—every one who could be shoved into line of battle for a last struggle. The Numidian horse, who had decided the result on the Ticino, on the Trebbia, on Lake Thrasymene, and on the Aufidus, was now arrayed against him, under the vile and subtle but undoubtedly able Massanissa. These horsemen decided the last decisive battle of the second Punic war.

After this event Hannibal, as a general, appears no more on the war scene as a grandiose character. As a patriot, politician, administrator, restorer, he looms up even more extraordinarily. Carthage was no longer the rival of or a danger to Rome. But the great Carthaginian there and everywhere while he lived was a menace and a peril to the conquerors. Like sleuth-hounds they hunted him, an exile, from refuge to refuge, to the last moment of his life unceasingly an object

of dread. The individual seemed as dangerous in his old age, alone, without support, as the hero in his prime, when he cast his javelin over the Colline gate into affrighted Rome. To escape their unrelenting pursuit and a captivity in their cruel hands, perhaps a hideous death, an immolation on the altar of revenge, Hannibal took poison. Thus died the greatest man of all the ancient world, and the greatest captain this world has ever seen,—perhaps will ever see.

Pages might be devoted to his eulogies, but Niebuhr (373) sums up all that human words can aggregate, in sentences which almost blaze. His concluding words are almost a sufficient epos: "Wherever he was he commanded; . . . he bowed before no one; he never violated truth, nor did anything which was opposed to the dignity of his character.[4] This man I honor, esteem, and love almost unconditionally——"

"A carbuncle entire, as big as thou art,
Were not so rich a jewel. Thou wast a soldier
Even to Cato's wish, not fierce and terrible
Only in strokes; but with thy grim looks, and
The thunder-like percussion of thy sounds,
Thou mad'st thine enemies shake, as if the world
Were feverous and did tremble."

J. WATTS DE PEYSTER,
Brev. Major-General S. N. Y.

[4] Hannibal, a Historical Drama, by John Nicol, B.A. Oxon., 1873, contains not only a fine reproduction by photograph of a bust of the greatest Carthaginian, but also passages of magnificent situations and poetic thoughts, and copious notes most valuable and interesting, revealing facts not to be found in modern works. The writer has the only copy he has seen or heard of in this country. In Note 33 Nicol observes: "Mr. Hennebért, whose admiration for the greatest Captain this world has seen cannot exceed my own . . . says: 'Cet homme n'avait pas un seul défaut, une seule faiblesse!'"

THE ENGLISH NAVAL PRIZE ESSAY, 1880.

"NAVAL TACTICS ON THE OPEN SEA WITH THE EXISTING TYPES OF VESSELS AND WEAPONS."

By Captain the Honorable EDMUND R. FREMANTLE, C.B., C.M.G., R.N.

"Nil sine magno vita labore dedit mortalibus."

CHAPTER I.—*Modern Weapons.*

IN these days we are far removed from the charming simplicity attaching to the old conditions of a naval engagement, when there was no dispute as to the vessels or weapons to be used, and only ships of two or three decks, with their broadsides of forty or fifty guns, were admitted to the honors of the line-of-battle. That frigates were not to take any part in a general action was admitted on all sides; while the only question hotly debated in the pages of James was as to whether sixty-fours were entitled to rank as ships of the line.

Now we are rather in the position of the challenged in the days of dueling, viz., that we have the choice of our weapons, with the marked difference that our challenger has also the choice of his. What are these weapons to be? The ram, the gun, the torpedo are all available for use in the open sea, as "existing types of weapons," in the terms of the subject given for the essay. Which shall we use? Can we use all three in the same ship, and, what is more, at the same time? These are questions which it becomes our business to answer.

The next question which inevitably occurs as a corollary is: Having chosen our class of ship and our weapon, to which family shall it belong? Shall we have specimens of different families of the same genus acting in concert? or shall we put all our eggs into one basket and stick to one class for all purposes?

The choice before us is so large that it will be best to lay down certain limits to our inquiry.

Let us then compare,—

(1) The power of the ram.

(2) The power of the gun.

(3) The power of the torpedo.

Let us take first the ram as a weapon of offense. Its power lies,

first, in the shape of the beak, or ram; for, as with the gun, it is evident that the "energy per inch" of ram or spur in contact with the side of an enemy is the true figure of the penetrative power. That there is some limit to this, in consequence of the danger of the spur being wrenched off the attacking ship, may be admitted, but practically we prefer the sharper snouts of the "Nelson," "Inflexible," "Thunderer," and other modern ships of our own and of the French navy, to more moderate spurs advocated by Commander Noel. It is probable that we shall see the snout in its extreme form in the novel ram "Polyphemus."

Secondly. The speed of which the ship bearing the ram is capable, being the propulsive force.

Thirdly. The turning power or handiness of the ship, being its power of being used in various directions.

Fourthly. The size or weight of the ship.

In all these points the gun may compare with the ram, having an unquestioned advantage under the first three heads, and a disadvantage in the last point. There is, however, one all-important matter which makes the ram so favorite a weapon. With the gun it is only by rare good luck that penetration can be effected below the water-line; and the most that can be expected is to sink a ship by a few fortunate hits "between wind and water." The ram, on the contrary, if it hits at all, strikes in a vital point; and though, as we shall see, it is not necessarily as fatal under all circumstances as is popularly supposed, yet no ship can expect to survive a direct blow of a ram from a heavy ship moving at fair speed.

The sinking of the "Cumberland" by the Confederate States' frigate "Merrimac" in Hampton Roads, during the American war, first opened the eyes of naval strategists to the power of the ram; but it was not till the action of Lissa, in 1866, that the question of weapons may be said to have been decided in favor of the ram in popular estimation.

Tegethoff not only used his ram as the effective weapon, but, after the first charge, the broadside guns were secured, and only bow and stern guns kept in action. We do not wish to quote this as by any means conclusive. The Austrian ships had no plate-piercing guns, and the ram became practically their only weapon, which Tegethoff deserves the credit of appreciating. It must also be remembered that when Lissa was fought the Whitehead torpedo was not invented. Still, the fact remains that from Lissa dates the all but universal agreement of naval officers of all nations as to the ram being the weapon *par excellence*. The "Re d'Italia," whose rudder had previously been damaged, was sunk by the "Ferdinand Max" by a determined effort, after some unsuccessful attempts, it is true, but the catastrophe which sent the flag-ship of the unfortunate Italian Admiral Persano and her crew to

the bottom was so sudden, so complete, so tragic in its details, that it took the naval world by storm.

The Russian Admiral Boutakof, the French Admirals Bouet-Willaumez, Jurien de la Gravière, and others, such as Admiral Bourgois and Captain Lewal of the French navy,—indeed, all foreign officers who have written on this subject,—have assumed the ram to be the weapon of the day. The French system of naval tactics, which had only been issued in 1861, was again altered a few years subsequently as inapplicable to attack by the ram (*pointe*), as it appeared to the French authorities that rectangular movements were dangerous in an action to be decided by rams.

In our own navy the views have been almost equally decided in favor of the ram. Certainly, none of our naval architects would now dream of building an ironclad without a ram.

In the Junior Naval Professional Essays for 1862, all the authors of the published essays agreed in giving the prominent part to the ram. Lecturers at the Royal United Service Institution, Captains Colomb, Dawson, Bridge, and the speakers at the evening meetings, have generally taken the same view. Admiral Randolph is quite as strong on the subject in his lectures and recently-published "Problems."[1] It is to be remarked, nevertheless, that the English opinion is scarcely as decided or enthusiastic on the subject as that of foreign authorities.

Captain Colomb, for instance, in his "War Game," to which we shall allude more fully subsequently, takes the part of a ship which has no intention of ramming, and proposes to gain a victory by his broadside guns; though, in a former paper read at the Royal United Service Institution in 1871, he appeared to be more decided both as to the reduction in power of the gun and the importance of the ram.

Of the ram he then said, "So far from ramming being a difficult or impossible task, it is a thing that can be accomplished by superior skill with vessels otherwise equal."

Admiral Randolph, again, in his "Problems," before alluded to, although his tactics are mainly based on the ram, gives as his first postulate: "That the maximum power of attack requires the freest possible use by each ship of its ram and artillery (torpedo included), without injury to friends."

Such, then, is the strength of professional opinion. Let us turn now to the theories and facts themselves on which these opinions are presumably founded.

The power exercised by the stem of the "Polyphemus," assuming her to be ramming at her extreme speed of 17 knots, would be 32,000 foot-tons, or more than that of the 80-ton gun, at the muzzle, which is only 27,000 tons; her great speed here coming in a prime factor in the problem.

[1] "Problems on Naval Tactics." By Vice-Admiral Randolph.

With a larger ship a smaller speed would suffice, but from the well-known formula $\frac{WV^2}{2g}$ it is evident that speed is of greater importance than size; thus it will be found that it would require a ship of nearly 8000 tons at 10 knots speed to perform the same work as the "Polyphemus." Of the power of the ram itself we have numerous instances both in peace and war.

In war we have the destruction of the "Cumberland" by the "Merrimac," and that of the "Re d'Italia" by the "Ferdinand Max," before alluded to. In the present year we have had fresh illustrations of ramming in the exploits of the Peruvian ram "Huascar," and it is a subject of regret that correct information is not likely to be forthcoming on the naval actions between the Chilians and Peruvians, as they must be full of "wise saws" in their "modern instances" of naval combats.

As we write the "Huascar" appears to have fallen a victim to her opponents, but we have no particulars.

Enough is, however, before us to show how powerful the ram is; yet if we look beneath the surface we shall find that in all the cases above referred to, the successful blow has been preceded or followed by unsuccessful efforts. The "Merrimac," as is well known, although successful against the "Cumberland," either from insufficient speed or a damaged prow, failed to sink the little "Monitor," although she several times attempted to ram her.

The "Ferdinand Max," again, did not succeed in her first attempt, and although all the Austrian and some of the Italian ships tried ramming tactics, hers was the only successful effort, even the wooden Austrian line-of-battle-ship "Kaiser," although rammed by the "Affondatore," remaining afloat.

The "Huascar," again, although she sank the "Esmeralda" after several attempts, failed on other occasions; so that, fatal and conclusive as a well-delivered blow from a powerful ram must inevitably prove, it is evident that no blundering, half-hearted collision will suffice to sink an opponent, but that the ram must be made determinedly and the blow struck at high speed and as near as possible at right angles to the enemy's course.

Our illustrations from peace service and accidental catastrophes are unfortunately more numerous and instructive than those deduced from the rare occasions afforded by modern naval war. We may discard the collisions of merchant ships, or of men-of-war with merchant ships, such as H.M.S. "Amazon" with the "Osprey," or of the United States corvette "Oneida" with the "Bombay," for in men-of-war with men-of-war enough remain for our purpose.

Of two successful collisions, those of the "Iron Duke" with the "Vanguard," and of the "Kœnig Wilhelm" with the "Grosser Kurfurst," are the most familiar and instructive. In both cases heavy ships

at moderate speed sunk their unfortunate consorts by one blow delivered at an angle of 20° to 30° from the perpendicular to the course of the other ship. In the case of the German ship "Kœnig Wilhelm" she was nearly sunk herself, having no collision bulkhead, and her ram being unsupported; but the "Iron Duke," on the other hand, was practically uninjured.

The "Grosser Kurfurst" was a turret-ship with little reserve of buoyancy, and sunk in twenty minutes, the majority of the crew being drowned. The "Vanguard" remained afloat for seventy minutes, and all her crew were saved. The difference in these cases points to the necessity for having an "iron-built armored ram-bow,"[2] and also to the use of double bottoms, as we shall see presently.

As there seems to be some misunderstanding as to this question of rams and armor, it may be worth while to deal more fully with this subject.

In April last, during a discussion at the United Service Institution, Admiral Sir George Elliot expressed his decided preference for the "Dreadnought" over the "Inflexible," on account of the greater strength of the former's bows through having her armor-plating carried right forward; and he was answered by Mr. Scott Russell, who wished to rid his hearers of "the supposition that the armor in the bow of the ship is of the least use in giving the strength necessary to make her a better ship in case of ramming."

Now we hold that the admiral was substantially correct, and it is certainly an important point to be considered by either rammer or rammee.

The following extract from Mr. White's work before alluded to is interesting as bearing on this question, and though rather long we cannot refrain from quoting it. He says, speaking of the "Iron Duke" and "Vanguard" collision:

"At the time of the collision the 'Iron Duke' is said to have been going 7½ knots, her course being six points off that of the 'Vanguard;' the direct force of the blow delivered was 12,000 foot-tons. Fig. 26, page 35, illustrates the damage done to the 'Vanguard,' the armor being driven in bodily, and the outer bottom pierced by a huge hole some 30 or 40 feet in area. Such a blow of course reacted on the bow of the 'Iron Duke,' tending to drive it back into the ship; and meanwhile the 'Vanguard' had a speed athwart the bow of the 'Iron Duke' of no less than 6 knots, the motion producing a tendency to twist and wrench the bow as well as to perforate the skin. The simple and comparatively light arrangements of the ram-bow answered admirably when thus severely tested, subsequent examination proving it to be so little damaged that the 'Iron Duke' could in action have ven-

[2] "Manual of Naval Architecture." By W. H. White, Assistant Controller, Royal Navy.

tured safely on a repetition of the blow, and yet have remained efficient. Special interest attaching to this matter, Figs. 93–95, has been drawn to illustrate the principal features in the framing of an iron-built armored ram-bow, and only a few explanatory remarks will be required.

"The stem is a solid iron forging weighing several tons. Against direct strains tending to force it backward it is supported by longitudinal frames or breast-hoops, as well as by the armor-plating, backing, and skin-plating, all of which abut against the stem. . . . Perforation of the skin is rendered difficult either by carrying the armor low down over the bow or by doubling the skin-plating forward below the armor.

"The former plan is preferable, being more efficient against perforation, and also giving protection against raking fire when engaged bow-on to the enemy. It has been very generally adopted of late in the Royal Navy, and the French also favor this plan.

* * * * * *

"Such are the main features of the ordinary ram-bow in an iron-built ironclad ship."

In another place Mr. White speaks of the armor shelf of the "Vanguard" as bringing up the "Iron Duke," and while he advocates very strongly double bottoms and internal subdivisions, he intimates pretty clearly his opinion in corroboration of the general service view that the "Vanguard" would not have been lost had the wing-passages or inner skin been carried up to the main deck, as in previous ships.

We have dealt so long on this subject, as every officer should be well acquainted with the strength and weakness of his ship, and it is idle to talk of ramming if no confidence is felt in the strength of the vessel intended to use the ram. Our naval readers will all recall numerous instances of small accidental punctures to the thin iron skins of formidable ironclads, and in the rough test of ramming they will feel more confidence in those ships whose water-line is protected by armor-plating, which is a thick hide not easily pierced, and which can and, as we have seen, does in our modern ships add to the strength of the structure.

In an account of the French ship "Amiral Duperré" given in vol. xxiii. of the Journal of this Institution, we are told that "her stem is of wrought iron in the form of a ram, and receives the butts of the water-line armor-plates; the lower edges of which are brought down forward nearly ten feet below the water-line to the very point of the ram."

The "Dugueslin," another French ship, is stated to have "a ram in the form of a snout, tipped with a metal coating, of extraordinary length."

It would appear that more attention has been paid to this important question of ram-bows in foreign navies than in our own. It is true that the strength of our bows is probably all that can be desired; they

are in the "Inflexible" and other modern ships attached to the fore end of an armored deck, which supports it[3] most efficiently "against direct and wrenching strains," but it is difficult to feel equally satisfied with the strength of the whole side of the ship which has no thick armor to resist penetration and distribute the crushing strains over a sufficiently large area. It has always struck us as possible to have improved upon the American plan of an overhang, and to have an armored deck projecting outside the skin of the ship four or five feet, which would at least force the enemy to have an inordinately long spur, which would make but a small hole. In these days of bilge keels and batteries projecting from the ship's side, even such an excrescence as we have suggested would appear to be worthy of consideration if, as we believe, it would afford a reasonable protection against a ram-blow.

That it would be a sort of counter-ram of some danger to the ramming ship is evident, and we would propose that it should taper towards the bow and stern, having only its full breadth in the most vulnerable part amidships.

We have alluded now to successful, though accidental, rams, but, in accordance with our contention that all rams, even from heavy ships, unless striking normally at considerable speed, are not fatal, we may refer briefly to a few such in our own navy.

Thus, we have had collisions between the "Minotaur" and "Bellerophon," between the "Hercules" and "Northumberland," in which cases double bottoms, wing-passages, and compartments proved so efficient that, although considerable injury was done by the ram, the rammee was able to continue on service as if nothing had happened until it was convenient to repair her.

This, then, is the case for the ram. It is a formidable weapon, although not quite so fatal as is popularly supposed, and in foreign navies it is unmistakably given the first place. Let us turn now to the guns.

We cannot afford space for an elaborate inquiry into gun-power, nor does it bear so directly as the ram on the subject for the essay. It is a truism to say that to make a good use of the gun a single ship or *a fleet must be properly manœuvred, but if the gun is to be depended* upon the tactics become simpler, and culminate in an attempt to keep the broadside of your ship at a certain fixed distance from the enemy.

The gun can be used without the ram, but if the ram is used guns can always be made serviceable to supplement its action.

To attempt the former in a fleet-action against an enemy determined to ram would evidently be not only demoralizing, but disintegrating. No system of tactics could be framed contemplating such a state of things.

[3] "Naval Architecture." By Mr. White.

It may still, however, be held that, while using ramming tactics and being ready to ram, from mutual failures to strike a successful blow, the action may after all be decided by the gun, and that, whilst beginning by taking a subordinate part, it would finish by being the principal agent in success or failure. We cannot, therefore, ignore its position, although we do not propose, for the above reasons, to attempt a critical examination of its power.

Our ships are now armed in every different way conceivable. We have ships entirely armed with a few heavy plate-piercing guns, such as the turret-ships "Inflexible," "Ajax," "Agamemnon," "Neptune," "Monarch," "Dreadnought," "Thunderer," and "Devastation," some of these being intended for broadside and some for end-on fire, the ram forming an important part in their fighting qualities.

In older ships, such as the "Warrior," "Black Prince," "Resistance," "Defence," "Achilles," "Hector," "Valiant," "Northumberland," "Minotaur," and "Agincourt," we have, as Captain Colomb tells us,[4] "only faint indications of an opinion in favor of end-on fire," while the ram, which has no existence in the "Warrior" and "Black Prince," can scarcely be said to be intended for serious use in such long vessels as the five-masters.

Obviously, in vessels not intended to use the ram the gun must have the first place, and if the "Warrior" and her sister-ship the "Black Prince," or even the "Minotaur," "Achilles," "Northumberland," and "Agincourt," are to take their part in a modern fleet, the ram must be subordinate to the gun.

Generally, as has been ably pointed out by Captain Colomb,[5] who is the only authority to whom we can appeal as having even attempted to solve the relative positions of the gun and the ram, the fewer the guns carried, whatever their size may be, the greater the trust which must be reposed in the ram. Heavy broadsides, even from numerous 9-inch and 10-inch guns, in these days of thick plating and partial protection, are probably more demoralizing and effective than the lesser number of shot from larger guns.

The old adage about "not putting all your eggs into one basket" applies equally to guns as to ships. As Nelson said, "In a naval action something must be left to chance," and those who fire the largest number of shots must have the greatest number of chances.

In Commander Noel's Essay on "Great Britain's Maritime Power," he shows, by an elaborate table, that thirty 12-ton guns might in ten minutes fire fifty tons weight of shot, with a total energy of 696,600 foot-tons, at 4000 yards, twenty 18-ton guns, in the same time, throwing

[4] "Broadside Fire and a Naval War Game." Lecture at the Royal United Service Institution, 1879.

[5] "Attack and Defence of Fleets." Lecture at the Royal United Service Institution, April, 1871.

thirty tons weight of shot, with a total energy of 454,750 foot-tons, at the same distance. In the case of the 12-ton guns, there are reasons for supposing that the data taken by Commander Noel from the prize firing of the "Iron Duke" and "Triumph" are unusually favorable, and there is certainly some virtue in having the larger gun where the disproportion of weight of shot and energy is not considerable. Further, we know from official data that the 12-ton gun will penetrate 11½ inches of unbacked armor at the muzzle, 9½ inches at 1000 yards, and 8 inches at 2000 yards, while the 18-ton gun will penetrate 14½ inches, 12½ inches, and 11 inches respectively, under similar conditions.

It will be found, then, that at 4000 yards, the distance taken by Commander Noel, the penetration of the 18-ton gun would be 8.7 inches, against 6 inches for the 12-ton gun, and at that distance the actual penetration of armor-plating would stand, in round numbers, as 3,949,800 inches for the 18-ton gun, against 4,176,000 inches for the 12-ton gun, thus reducing the two guns to almost an equality.

We will not pursue this subject any farther, as doubtless many will be ready to say that it is only another instance that anything can be proved by figures.

Our endeavor has been to hit off a fair medium for a broadside ship between heavy and light guns, and to combine sufficient penetrative power with a good weight of broadside and such a shower of projectiles as would give us some chances of lucky shots in our favor.

As to probability of hitting, we have literally no good means of judging, as even Captain Colomb's attempt in this direction, drawn from prize firing and the "Vigo" experiment, can scarcely be regarded as successful.

We are not even accurately informed as to the relative value of broadside or independent firing, broadside or end-on fire, electric or manual firing. On the first point, at least, we may ask for more information, which could be easily drawn from experiment. We are aware that some attempts in this direction have been made by the French Government at Havre, but they are certainly not conclusive, as far as we are informed. It would appear, however, that the general opinion, which has advocated broadside fire as the most likely to give satisfactory results against iron plates, is well founded.

In an elaborate paper, translated from the *Revue Maritime et Coloniale*, by Lieutenant Lees, R.N., an attempt is made to solve the problem of "the best mode of firing guns in a naval engagement," but in spite of the ingenuity and theoretical accuracy of the tables drawn up by Mr. Lucca, of the Italian Navy, it is evident that but little reliance can be placed upon them.

The table attached to Captain Colomb's "Naval War Game," based on penetration, on the size of the object to the eye, and the striking angle due to the relative course of the two ships, is probably as accurate

a guess as can be made, and he gives no value for ranges over 2000 yards.

On the vexed question of broadside *vs.* end-on fire we can only give our own views, with which we believe that the majority of naval officers will agree.

To leave a ship without bow or stern fire would seem suicidal. As pointed out by Admiral R. V. Hamilton (Director of Naval Ordnance), in his lecture on the "American Naval Engagements," vessels in proceeding up rivers, or in attacking forts, must require bow fire. In single-ship actions, again, as was often found in the old wars with sailing ships, bow and stern guns frequently decided the result. Now they will be more than ever required.

What is to be done with an enemy of equal speed who persists on lying on your bow, if you have no bow fire? You can run away, of course, or give him a broadside, and allow him to escape you, but you must give up what would be the most advantageous position for a ram with good bow fire. Still worse, what is to be the fate of a ship without stern fire against an enemy with good bow fire, of equal speed, which gets within 500 yards astern?

As Admiral Elliot said of a ship in such a position, "That ship is mine." Nothing but stern fire or the Whitehead torpedo could save her.

We hold, at the same time, that to sacrifice broadside for bow fire, or to make the former subservient to the latter, is an entire mistake, except in vessels built for special circumstances, as the "Gamma" class of gunboats, but when carried to the point it has been in the "Alexandra" and "Téméraire," which are intended for fleet-ships, we cannot but consider it a mistake.

In the "Shannon," "Nelson," and "Northampton," on the other hand, while broadside protection has been dispensed with, broadside fire has not been materially interfered with, and their case can be defended on other grounds.

We hold, however, that bow and stern fire are essential, and we go farther, and as will, we think, be clearly seen when manœuvres of single ships are considered, we hold the necessity for a heavy stern fire as of primary importance to that of bow fire.

If, however, our view of a fleet-action is correct, a heavy broadside is a necessity, and in a general action end-on fire is of secondary importance.

Of improvement of guns by chambering we have taken but little notice, as, although the 38-ton gun, for instance, has with an increased charge had its energy per inch of shot's circumference raised from a figure of 287 at the muzzle to 350, an equivalent will probably be found in the substitution of steel for iron plates, or in a mixture of the two, as in the "Agamemnon."

Assuming Jurien de la Gravière's axiom as correct, that, in a fleet intending to ram, no shot must be fired in advancing towards the enemy, it becomes almost a necessity that the fire should be opened by a broadside. What is the best method of delivering this broadside? The service plan would be that it should be delivered by electricity, by an officer of cool head and good judgment. Against this we have Admiral Randolph's great experience.[6] He draws a Byronic picture of the officer awaiting the moment when, without even a gesture of command, by

> "A finger's pressure, nothing more,
> The ponderous cannons' thundering roar,
> A passing cloud of smoke, and lo!
> The waves engulf the haughty foe."

This, says the gallant admiral, is a dream, his view of it evidently being, "*C'est magnifique, mais ce n'est pas la guerre.*"[7] In another paper he argues the question of electric firing more fully, but it is evident that he does not believe in broadsides, and that independent firing is his aim. He points out truly that to continue broadside firing in a general action would be too great a tax upon any captain's powers, and that it must end in failure. Here we agree with him, but it will be all-important that there should be no premature firing, and to prevent this let the first firing be under the direction of the captain. Then, if you like, "Cry havoc and let slip the dogs of war," but the first object of a captain should be to bring his men to close quarters with the enemy while still cool and under command. It is certain that there will be less excitement and more careful firing subsequently. As in a bayonet charge, which is so often successful because the side having resort to it has more men under command ready to come to close quarters, so by reserving your fire and bringing your men alongside the enemy unruffled, and probably lying down to escape the first fire of your opponent, you gain an immense advantage.

We can propose, on these grounds, nothing better than electric firing by director for the first broadside, though there should be an alternative of electric firing by the "directing gun" to be used by the officer of the battery should any accident happen to the officer at the director.

A word on directors and concentrated fire. The former are too elaborate. There are corrections to be applied for everything, many of which might be eliminated by a simple method. Why, for instance, is it necessary to concentrate at every convenient distance and bearing, and to apply corrections to every gun? Would it not be clearer to return somewhat to the older method of only concentrating at certain fixed bearings and distances?

We would propose—

[6] Lecture, Royal United Service Institution, January 24, 1879.
[7] Lecture, Royal United Service Institution, February 21, 1879.

Close alongside—abeam.
500 yards, 10° before the beam, abeam, and 10° abaft the beam.
800 yards, " " "

For these distances the marks might be plainly shown on the racers, and the dip, etc., similarly allowed on the director, by having three arcs engraved on it, the only correction remaining to be made on the latter being that due to the speed. We hold concentrated broadsides over 800 yards to be unpractical, though, if required, it is evident that good shooting would be made by firing a broadside laid for 800 yards, at 1200 yards distance.

It is true that we are substituting a rough-and-ready system for a nominally more accurate one, and that no real concentration close alongside would be possible, but those who have remarked how often corrections are wrongly applied, in drill and by seamen gunners Nos. 1, will probably agree with us that some attempt at greater simplicity is absolutely requisite. We hold, too, that there is a necessity for our guns giving greater depression. An attempt to ram misses, and ships are about to grind their broadsides together. Foreseeing this probability, orders have been sent to the battery to lay all the guns for "close alongside on the beam," with the intention of firing at the enemy's water-line at the moment of broadside collision; the guns are fired accordingly, but, for a want of sufficient depression, the shots do not take effect as intended; if at a "Polyphemus," or low ram, or monitor, the shot will go over her, repeating the experience of the "Speedy" and "Gamo," and there will not be wanting bold seamen to follow Lord Cochrane in trading upon this weakness of large ships.

Most of our ironclads can only give 8° depression from their main-deck guns, and but little more from their upper-deck guns. Assuming the muzzle of the gun to be only 11 feet from the water, and the gun to have 8° depression, it will be found that the shot will strike the water if the ship is on an even keel at 80 feet distance. If fired from an upper-deck gun, say 30 feet above the water, and with 9° of depression, this distance is increased to 190 feet. If we are correctly informed, the barbette guns of the "Téméraire" are capable of giving but little depression, and it would be interesting to know at what distance the shot from these guns could strike the water-line of another ship. We consider this question of being able to give sufficient depression to all guns, especially in large ships, as one of the utmost importance, and we trust that it will receive more attention than it has hitherto.

As connected with gun-fire, the compass must not be overlooked. The compasses now supplied for firing are fairly efficient, but it is a point which has not been sufficiently considered. Sir William Thomson's compass, which has been so highly spoken of in many respects, would probably stand fire well, but we are not aware of any report of

this subject from either the "Minotaur" or "Thunderer," in which ships alone it has been tried.

The method for communicating orders from the upper deck or the conning tower certainly needs improvement. Neither voice-tubes nor messengers are sufficiently to be depended upon, but with a greater simplification of the director, as we have proposed, a telegraph and dial such as that used for the engine-room would answer all purposes, and might be fitted in all large ships.

In dealing with the gun and the ram, we are to some extent on the solid ground of experience; with the torpedo, we must, perforce, look more to theory than to practice.

The torpedo is in its infancy; the Whitehead has had no opportunity of showing how it stands the rough test of real warfare, while the Harvey and the outrigger are scarcely adapted for use in an action in the open sea.

Of ground or stationary torpedoes we need not speak here, but in the late American War, carried on chiefly in shallow rivers and lagoons, they proved fatal to no less than 25 Federal and 4 Confederate vessels, 3 of the latter being destroyed involuntarily, by their own torpedoes; and one Confederate ram, the "Alabama," was sunk by a daring attack by an outrigger. They show, at least, what had been doubted, owing to the non-success of the small-charge mines used by the Russians in the Baltic, that a good charge placed close to a ship's bottom was fatal.

Leaving ground-mines out of the question, let us turn to the offensive torpedoes. Of the Harvey, it might be sufficient to say that, notwithstanding the high favor in which it appeared to Commander Dawson and many other naval officers a few years ago, it has now been tacitly dropped, and large ships are allowed to return their Harvey torpedoes into store on application, but it may be worth while to give shortly our own views of its value.

When used from our large ships, it has generally failed to "dip" at all successfully, owing, no doubt, to the height at which it is towed, and we have seen it foul the screw by capsizing and turning in, instead of out. The French ships have a modified Harvey towed from the top-gallant forecastle; and other foreign governments have some variations of this torpedo, but although some of the defects may be obviated, we cannot believe in its being an effective weapon.

In official trials at which we have been present, it has been uniformly a failure. Either the "Grinder" was too fast, or the "Bloodhound" too slow, and in spite of the skill of experienced officers, all attempts at effectively striking a vessel under weigh were futile.

Our own experience is that it requires to be towed at exactly the right height, some 20 or 30 feet from the water, and at exactly the right speed, 7 to 8 knots, and under those circumstances, if very skillfully

handled, it may possibly prove effective. Even then it is almost as liable to endanger friends as foes, and it has been seriously proposed to continue their use solely as dummies, so as to frighten a nervous enemy from making use of his ram.

That such ruses have had their success we do not deny, but it will scarcely do to advocate as a principle a return to such Chinese practices as quaker guns and dummy torpedoes.

The Harvey has, however, been given up by its friends, so we need not waste words in "flogging a dead horse," for Commander Grenfell, who has had great experience in handling it, was subsequently generally acknowledged to have damned it by his very faint praise in a discussion at the United Service Institution.

The outrigger is a much more formidable weapon. From fear of the outrigger, ships will scarcely dare to lie at anchor in an open roadstead while blockading, and it might even be used with advantage from fast torpedo-boats of the "Lightning" class in a daring night attack against an enemy's fleet at sea.

But except under special circumstances, it would appear to be out of place in a fleet action. A fleet preceded by a cloud of torpedo-boats as skirmishers sounds well, but in real fight in daylight, at all events, they would stand little chance against torpedo guns and Gatlings.

As to using outriggers from large ships, it has always struck us as an attempt to put salt on a bird's tail. To go into action with outrigger booms from the bow or broadside would interfere materially with the speed and steerage of the ship, while to drop an outrigger torpedo at the right moment under an enemy's bow or counter assumes too much skill on our own part, and too much simplicity on that of an adversary, to be seriously taken into account.

Between ships at all equal in size, when an outrigger could be used, the ram could replace it with much greater effect, though a small ship might boldly attempt to use it for want of a better weapon.

We hold, then, for the above reasons, the Harvey and outrigger, or worse, the combination of both, to be the dream of arm-chair tacticians.

It will be seen that we discard also as unpractical any attempt at a defense outside the ship against the torpedo. "Porcupine drill" we hold to be useless, even when at anchor, while at sea it would be a fatal incumbrance.

Of the Whitehead torpedo, ingenious as it is, and with an unknown future, as daily improvements are made in it, we would speak with all respect, yet it is only a submarine gun or rocket of as yet uncertain value.

We say uncertain value advisedly, for whatever may be said in its favor by the Torpedo School, so far as our experience goes, when projected from a moving object, especially if from above water, when there is the slightest ripple its course cannot be depended upon. Our naval

friends will recollect some erratic Whiteheads even in such close harbors as Malta and Queenstown, to which we need not further allude.

A close consideration must show how uncertain a missile it is. The service speed of pattern A Whitehead is 12½ knots for 300 yards, or 9 knots for 1200 yards. The speed of the new pattern is to be 16½ knots for 800 yards, or 20 knots for 200 yards.

The "Polyphemus" is intended to discharge Whiteheads of the great speed of 28 knots, if such a speed is attainable. What we would point out is that even the highest of these speeds, marvelous as they sound, is ridiculous in a missile. How the unknown quantities of the speed of your own ship, which we know from the "Thunderer's" experiments is decreased nearly one-third when the helm is put hard over, and the speed and course of the enemy, which must be estimated, bear upon the course of the torpedo, can be plainly seen when using the ingenious director adapted for its use. It might be as accurate as it is ingenious, if the data were correctly stated, but when one side and one angle at least must be guessed at, it is impossible to feel any confidence in hitting a moving object when the torpedo is fired from a ship in motion.

When tried in the "Actæon" at 8½-knot speed, the deflection was found to be no less than 38°, and when discharged from the bow above water no accuracy of fire could at all be depended upon. There was an ugly story of a French ship having been run into on the quarter by her own Whitehead torpedo, which she had just discharged from the bow. We have a recent account of a torpedo discharged from the "Huascar," and the gallant Peruvian being only saved from being "hoist by her own petard" by one of her officers swimming towards it, and diverting its course, of which we may say "*Sé non e vero e ben trovato.*"

When fired from above water it is said to have less divergence, but to be less reliable.

We have said enough, not indeed to show that the Whitehead is useless, but to prove that it is still in its infancy. If we compare it with the gun, with its speed of 900 miles an hour, which allows of nice calculations of the speed of the ship being almost disregarded, the only necessity being to aim straight, even the 20-knot torpedo sounds absurd; yet it has one great compensating advantage in common with the ram in that, if it strikes at all, it strikes in a vital spot below the armor, and we know from the "Oberon" experiments that in spite of double bottoms, cellular compartments, coffer-dams, and other arrangements, a Whitehead striking fair, even with the reduced charge in the new pattern of 30 lbs. of gun-cotton, would do great, if not fatal, injury to an enemy.

We have endeavored to point out the strength and weakness of the ram, gun, and Whitehead. With the turning power or handiness of the ram we intend to deal fully in another chapter.

The question now raised is, With what weapon shall we fight?

And the answer must depend upon the character of the vessel and her armament. The "Warrior" must perforce fight with her guns or torpedoes, the "Polyphemus" with her ram or torpedo, while an "Alexandra" or a "Sultan" can use all three weapons. This, however, is not enough, and a further choice must be made. It cannot be too often insisted upon that a choice must be made of a principal weapon, the others being auxiliaries.

At Lissa it is clear that Tegethoff had made his election in favor of the ram, while Persano probably trusted to use any weapon which circumstances should render necessary, and we know the result.

This scarcely needs argument. A man who is armed with a sword, in addition to a gun, and has his belt lined with pistols, is either a buccaneer or a stage soldier, but in real warfare, ashore as afloat, we trust to one weapon, using others as auxiliaries, it may be; but we do not attempt to make use of more than one at time. In a fleet-action, as we have previously explained, unless both admirals are agreed to fight it out entirely with guns, ramming tactics are compulsory; but in a single-ship action, it is not so clear where the preponderance lies.

Captain Colomb, in his example illustrating his "War Game,"[8]—and we believe that it is a fair specimen of the result of the majority of single-ship engagements on paper,—shows that his broadside ship, X, fires 28 shots in 10½ minutes, against the bow-gun ship's, Y, 15, the latter always attempting to ram. Eleven moves having now taken place and no ram having been effected, he gives the victory to X, which has scored 496 points to Y's 256.

We have quoted the "War Game," which is a fair and ingenious representation of a single-ship action under known conditions applicable to real warfare, to point out that, if correct, it shows not only that broadside is of more value than end-on fire, but that gun-fire is of at least equal value to ram-power, for Y never succeeds in ramming X, while the latter, whose main object is to use his broadside guns, wins by their fire.

It is to be observed, however, that X only narrowly escapes Y's ram, and that had the latter taken effect she would very certainly have won the game.

After this illustration of the gun theoretically, we will conclude with a recent instance, which is highly suggestive of the relative value of different systems of armament, using the term in its highest sense to represent gun, ram, or torpedo.

In the action between the "Shah" and "Amethyst" and the "Huascar" we find that the Whitehead torpedo, although fired by the "Shah," proved a failure, so far as we can judge, from the ships not remaining stationary within fair range, which we have seen to be only some 900 yards.

[8] "The Naval War Game." By Captain Colomb. Griffin and Co. 1879.

The ram too failed to act, although, from Admiral de Horsey's report, it would appear that his movements were much interfered with by a well-grounded fear of the "Huascar's" ram.

What, however, are we to say to the guns? In an action of two and a half hours, according to Captain Colomb, and acquiesced in by Admiral Hamilton, Director of Naval Ordnance, we find the "Shah" firing 241 shots, the "Amethyst" 190, and the "Huascar" only 8, the "Huascar's," however, being 300-pounders. Of the shot fired by the English ships only 9 struck the "Huascar."[9] Fortunately none of those fired by the latter struck either of the English ships. Captain Colomb states that the result was no surprise to him, as he had on former occasions argued that only about "2 per cent. of the shot fired would strike an object in action."

After all, there is nothing astonishing in this; theoretical gunnery and firing at a mark with a small-bore at Wimbledon are both useful and instructive, but even in a land battle it used to be held that it required the weight of a man in lead for each victim, and we doubt whether Ginghilovo would afford more satisfaction from the Hythe point of view than the "Shah" and "Huascar" engagement did to the "Excellent."

With this practical illustration, we leave the question of weapons for that of evolutions and tactics.

CHAPTER II.—*Ramming Tactics—Single-Ship Actions.*

"In modern steam fleets," says Jurien de la Gravière, to whose writings we have all learnt to look for clear philosophical views of the changes in naval warfare, "the good manœuvrers have not been less rare; those who are fairly good (*manœuvriers suffiants*) are become more common." We might even go farther and say that in the Royal Navy at least the officers who are really capable of perfect management of an ironclad under steam, are less numerous than those who had made a name for themselves as brilliant seamen for their skill in handling a ship under sail in former days.

There are good reasons for this. The inherent difficulty in managing a ship under sail in crowded harbors or narrow waters almost forced upon any naval officer who wished to be considered a competent seaman a serious study of seamanship. The kettle has emasculated seamanship, we are told, and in some senses it is true; it is certainly easier to manage a ship under ordinary circumstances under steam; and partly from this cause, partly from prejudice, it has come to be supposed that no study and but little experience is required for the manœuvres of an ironclad. The result has been pointed out by Jurien de la Gravière. When a new and improved weapon has displaced a less perfect

[9] *Vide* Discussion on United Service Institution's Naval Prize Essay, 1878.

one, this has been invariably the effect of the change. Thus, when the long bow was replaced by fire-arms in the days of Henry VIII. we have great regrets expressed at the discontinuance of the national practice with the favorite weapon; but it has been reserved to the present century to appreciate the necessity for perfecting our men in small-arm firing. No doubt it was considered that any one could hold a shooting-iron straight, it was so much easier than practicing with the bow. This is or rather has been our case with regard to the management of steam ships, but we are beginning to awake from our delusion.

Our profession, to quote Jurien de la Gravière again, "was formerly an instinct; it is now a science."

How many naval officers care to know the number of degrees of helm that can be given to their ships; the tending of the screw to turn the ship unassisted by the rudder; the effect of turning the engines astern when the ship has head or stern way; the result of increasing or reducing speed on the circle described in turning; what the nature of the so-called circle is; what the reduction of speed by putting the helm hard over; what heel helm hard over may be expected to give the ship; what the drift angle means; what is the time of completing a circle at different speeds, and its diameter? These and other questions are simple points of seamanship; yet an officer who would think himself disgraced if he could not answer at once as to the lead of the lower studding-sail halyards, or a flying jib-guy, neither of which have been supplied to the ship in which he is serving, will acknowledge without a blush that he does not know if his screw is right- or left-handed, or how many blades it has. History repeats itself, and it was probably much the same with the young gallants of Henry VIII.'s court.

If we turn to the writers on naval tactics since the days of steam, we find the same idea. Thus, Sir Howard Douglas, in his "Naval Warfare with Steam," whilst showing the capabilities of steam ships, assumes them to be able to make instantaneous movements, rectangular or diagonal, in obedience to their helms, ignoring the curves which must be described.

The Russian Admiral Boutakof, in his "Tactique Navale," published in 1862, criticises the "remarkable book" of Sir Howard Douglas as "beginning by the branches instead of from the root." He says truly that "if only three ships are to navigate in company, they must have rules based on the laws regulating their movements, and the knowledge of these same laws is indisputably necessary to each ship when she is even cruising alone." He claims to have derived his tactics by starting from "the root,"—that is, from the circle described by the ship.

Boutakof, however, in spite of his experience with, he tells us, 40 gunboats in the Archipelago of Finland, in 1861 and the two follow-

ing years, which furnished him with "many new 'conceptions,'" seems to have uniformly worked on the principle of the circle of evolutions being an exact circle.

It is not a little amusing to find M. Lewal, a Capitaine de Vaisseau of the French Navy, in an elaborate and scientific work on naval evolutions, published in 1868, asking if Admiral Boutakof has dug deep enough to find this root; and he answers, "Unfortunately, no! He accepts purely and simply the circle as the point of departure, and this is a capital error." For exercises and ordinary fleet evolutions this may be near enough, but when used for exemplifications of ramming tactics, his point of departure being inaccurate, none of his deductions can be accepted.

It was not till 1863 that some experiments on the turning of ships were made by Sir Cooper Key, when Captain of the Steam Reserve at Devonport, and about that time, in the steam trials by the Steam Reserve Officers, the turning powers of all ships were tried, and the times occupied in completing the half or whole circle registered. Recently these data have been supplied to officers in the "ship's books." In all these trials, however, it has been assumed that a circle has been described, and it is not till recently that the real path of the ship has been scientifically ascertained and noted, as in the case of the "Thunderer" trials in November, 1877.

To foreign officers, and more especially to Admiral Bourgois and Captain Lewal of the French Navy, is due a critical and scientific examination of the problems connected with the turning of ships, to which the attention of constructors and officers of our own navy has only recently been directed.

We propose here to give simply some of the conclusions arrived at, referring to the admirable paper "On the Turning Power of Ships"[10] by Mr. W. H. White, read at the United Service Institution in May last, and the subsequent discussion, for our facts. We could wish that the data for each ship were more fully given in compliance with what is now allowed to be requisite, for at present Mr. White tells us that the observations made by the Dockyard authorities include—

(1) A record of the time occupied in putting the helm over.

(2) A record of the times occupied in turning the half circle and full circle respectively.

(3) A measurement of the diameters of the "circles" in which a ship turns.

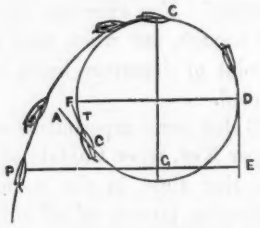
It will be evident from what we have said above that this will give but a very rough idea of the real course followed and distance run by the ship.

[10] In Chapter XIV. of his "Manual of Naval Architecture," Mr. White has also given a very good account of the principles ruling the steering of ships, but it was antecedent to the "Thunderer" experiments.

Let us, however, refer to the real path of the ship as explained by Mr. White.

The figure below will show the path of the ship to be a spiral, and according to Mr. White it was not till the ship had turned through 360° that the motion had become practically uniform. Admiral Bourgois puts this earlier, when the ship has turned 90° only.

FIG. 1.



The angle ACT is the drift angle.

The drift angle is the angle between the tangent to the circle and the keel-line of the ship. This drift angle is said to be the principal cause of the decrease of speed, and the rudder pressure has little to do with it. The following table gives the drift angle of the "Thunderer"[11] with a constant helm angle, but with variations in the speed. Owing to the drift angle, it is incorrect to assume that the ship has passed a quarter, half, or whole circle when the ship's head has turned through 90°, 180°, or 360° respectively.

Speed on Straight.	Drift Angle.	Diameters of Circles (Feet).	
		Bow.	Stern.
	°		
8.2 knots	5½	1350	1410
9.4 "	8½	1255	1345
10.4 "	9½	1240	1340
11.14 "	9½	1240	1340

The following table shows the angle of heel due chiefly to centrifugal force. The greater heel of the French ships referred to is probably due to their being masted ships. This heel varies, according to Mr. White—

(1) Directly as the square of the speed of the ship.

(2) Inversely with the metacentric height.

(3) Inversely with the radius of the circle.

[11] Experiments made by "Inflexible" Committee in October, 1877, and published with Report, 1878.

	Speed on Straight.	Diameter of Circle.	Draught.	Metacentric Height.	Angle of Heel.
	Knots.	*Feet.*	*Feet.*	*Feet.*	°
"Thunderer"	8.2	1340	26.3	3.12	0.52
	9.4	1250	26.1		1.11
	10.4	1240	26.1		1.14
"Tourville" (French)	15	2030	"	"	3.30
"Victorieux" "	10	1290	"	"	2.0

From the next table the reduction in speed of the ship will be clearly shown; according to Mr. White, it may be taken at three lengths. In French experiments, according to Admiral Bourgois, the time of turning the first quadrant is uniformly less than for the remaining quadrants, which does not agree with the results in the case of the "Thunderer;" thus the "Suffren" turned the first 90° in 1′ 33″, against 1′ 41″ for the remaining quadrants. The time of putting the helm over is, however, not stated.

	Time.	At End of Trial.	
		Speed of Ship.	Angular Velocity per Second.
	Seconds.	*Knots.*	° ′
To put helm over 31°	19	10 4	0 20
To turn ship's head 45°	56	9 25	1 18
" " 90°	89	8 3	1 18
" " 135°	123	7 75	1 15
" " 180°	159	7 5	1 12
" " 360°	320	7 14	1 6¾

In referring to Fig. 1, we think it will be found that the definitions given by Captain Colomb, in the discussion on Mr. White's lecture, will meet all requirements, and naval officers would soon become familiar with the terms used.

Thus, in the circle PCDF, P is the origin of ordinates on the spot when the helm is put hard down. Then we have the following elements:

PE is the "tactical diameter," or the distance between the two courses when the original course is reversed.

C is the point at which a curve of 90° will have been described.

PG and CG will be the co-ordinates of that point.

CG will be the "advance," or the distance the ship will have advanced towards an object or a shore ahead.

PG will be the "transfer," which will be rather more than half the tactical diameter.

FD is the "final diameter."

Obviously the "advance" and "transfer" are of the highest impor-

tance to a ram, and they should be known for every ship in the navy. The "tactical diameter" is also imperative, while the final diameter is rather interesting than useful.

The following table shows the tactical and final diameters of the "Thunderer" and "Victorieux":

	Helm Angle.	Speed on Straight.	Diameters.	
			Tactical.	Final.
	°	*Knots.*	*Feet.*	*Feet.*
"Thunderer"	31	8.2	1405	1340
		9.4	1320	1250
		10.4	1320	1240
"Victorieux" (French)	33	10.0	1440	1230

In the "Thunderer" the ship had *advanced* 1000 feet in the direction of a straight course before her head had swung through 90°, and the *transfer* was 760 feet; when she had swung through 180° she was still 520 feet in advance of the spot (P) where her helm was put over, and the tactical diameter was found to be 1320 feet, or considerably less than double the transfer.

The Mallory propeller is obviously beset with mechanical difficulties, as applied to large vessels, but it might be used with effect in torpedo-boats. It is a most ingenious arrangement for steering by the screw alone. Other special plans, such as bow rudders and bow screws, have been tried, but we need not discuss them, as they have not proved applicable to large vessels.

Of balanced rudders and auxiliary rudders, such as the Joessel plates fitted to the vessels of the "Comus" class, we need not say much. Any assistance in steering must be useful to a ram, but, with steam steering gear, balanced rudders may be said to have lost their *raison d'être*, while no auxiliary rudders yet tried have proved of much assistance. As Mr. White says, in summing up, "Twin-screws furnish the best combination of economical propulsion with manœuvring which has yet been produced."

The "Thunderer" being a double-screw ship, we have thought it useful to append the official trials of the "Lord Warden," which have been furnished us from the ship's book of that ship. She is a short ship, only 280 feet long, with an ordinary rudder, and hand steering gear with a left-handed four-bladed screw, and is reported one of the handiest ships in the service. It will be seen that the diameter of her circle, under the most favorable conditions, was 4.1 times her length, at 5-knot speed, and at 12-knot speed in 4.5 times her length, the times being 8′ 53″ and 3′ 49″ respectively. Admiral Bourgois quotes the "Marengo" (French), with a balanced rudder and Joessel plates, as

turning in 335 metres, 3.09 times her own length, and our "Thunderer" as turning in 3½ times her own length—*i.e.*, 1010 feet—in 4′ 25″. We do not know where the admiral gets his figures, but it will be seen that they are more favorable than the official ones given by Mr. White, both as to time and diameter of circle. His figures for the "Sultan" are still more favorable.

Times and Diameters of Circle of Turning of Her Majesty's Ship "Lord Warden," at Plymouth, 13th September, 1867.

Speed of Ship.	Turning to	Angle of Helm.	Time of Circle.	Diameter of Circle.	Remarks.
Knots.		°	′ ″	*Feet.*	
5	Starboard	25	9 3	1473	
5	Port	25	10 2	1494	
5	Starboard	36	8 15	1179	
5	Port	34	8 53	1158	(2)
8	Starboard	25	6 16	1569	
8	Port	25	6 40	1560	
8	Starboard	36	5 48	1428	
8	Port	36	5 50	1242	
12	Starboard	25	5 01	1668	
12	Port	25	5 07	1527	
12	Starboard	36	4 36	1668	
12	Port	36	3 49	1257	(1)

From the above data we may assume the ordinary man-of-war to turn in 4½ times her own length at high speed, and a double-screw ship in about 4 times her own length.

The most effective helm angle has not hitherto received much attention, owing to the fact that few ships are capable of giving enough helm. From some experiments made by Sir Cooper Key in the "Delight" gunboat, and by Admiral Halsted in the "Terror" floating battery, and with French rams, it would seem that up to 40° at least increasing the helm angle gives greater speed of turning and a smaller diameter of the circle.

The effect of a single screw on the steerage of a large ship is very marked; with well-immersed screws the rule is that the bow turns towards that side to which the descending blade falls. Thus, a ship with a left-handed screw turns to port under the action of her screw alone, or must be steered with port helm to keep her on her course. With ships of light draught the contrary is the case.

In heavy ships with single screws, left-handed, the bow still turns to port when going astern, and far more decidedly than is generally admitted. The explanation of this apparent anomaly probably is that in going ahead, owing to the dead-water, the upper blade has more thrust than the lower, having less slip. In going astern, the lower blade has the most effect. We are, however, dealing with facts, and not theories. Men-of-war are not often forced to go astern for any distance,

and the question has been overlooked, but if officers will observe the conduct of captains of screw-packets when going out of harbor, they will be astonished at the boldness with which steam is used going astern, on the assumption that she will turn in a certain direction, whichever way the wind may be. We are now quoting our own experience of the Shetland mail-steamers, which go out of Granton Harbor stern first at full speed, in perfect confidence that their bow will go to starboard. Their screws are right-handed, and the helm is only used as an auxiliary.

In the table of the turning powers of the "Lord Warden," it will be seen that the quickest time, 3′ 49″, was in turning to port, as we should have supposed, and the least diameter of circle, 1158 feet, was also turning to port, the diameter of the circle being also considerably less, and that much more when at slow than when proceeding at high speeds. The general tendency is, therefore, in favor of turning under starboard helm, but it is not as much so as might be expected, as we are informed that this ship carries one-half to three-quarters of a turn of a port helm when at a speed of 8 or 9 knots.

Seamen generally will agree with Mr. White, when he says that[12] "all single-screw steamers turn more quickly to one side than to the other" under similar helm angles, and it is important to the naval officer to ascertain his ship's qualities in this respect.

Professor Osborne Reynolds, in reporting a committee appointed by the British Association to investigate the effect "of propellers on the steering of steam vessels," states some interesting facts as the result of several experiments. He maintains that even before a vessel has lost her headway, if the engines are suddenly moved astern, the rudder has not only lost its effect in steering the ship when going ahead, but the ship will act and the rudder will affect her as if she had stern way. This, however, needs corroboration in our experience. He also states (and here we would ask for further experimental trials, as it is a matter of great importance) that "the distance required to bring a screw steamer to rest from full speed, by the reversal of her engines, is independent, or nearly so, of the power of her engines, but depends upon the size and build of the ship, and is generally between four and six times the ship's length."

The work of M. Lewal, to which we have before alluded, gives minute attention to all these points, but, as his work is 395 pages long, we cannot pretend to follow him. He generally agrees with the conclusions which we have quoted, except as to the time occupied in completing the circle under starboard or port helm, which he shows to be practically equal in French ships. His deductions from the trials of English ships bear out our previous assertion, though he is not aware of it, as he has fallen into the error of assuming English ships to have right-handed screws. His experience of the turning of a screw ship

[12] "Manual of Naval Architecture."

with stern way is very decided. In coming to, in the ironclad frigate the "Heroine," he states that he always turned to starboard, as he desired, in describing a curve of a very small diameter. He gives an illustration of the "energy and force" with which French ships turn to starboard under the influence of their screws moving astern, in the case of the "Massena," when coming to in Toulon, with a fresh breeze, in 1861, which is too long to be reproduced here; but if the facts are correctly stated, they show that the ship continued to turn her bow to starboard with stern way against her helm, and irrespective of the direction of the wind.

Such, then, are some of the principles regulating the movement of screw steam ships. To acknowledge ignorance of them, preferring mere experience or so-called practical judgment, is to prefer to fire a gun with a certain elevation, which experience, or general knowledge, enables one to guess, to a regular range table.

We should know our ship theoretically, and bring these theories into practice. If this were done, we are convinced that an extraordinary improvement in accuracy of manœuvring would result.

Captains, on commissioning ships, should be allowed the opportunity and enjoined to make an early trial of their ships under all possible circumstances, especially as regards the effect of the screw on the steering, both in going ahead and astern. They would also easily time the circle under starboard or port helm, and it could be measured in fine weather without much difficulty. It would, however, be more satisfactory if a table giving all the ordinary information on these points were drawn up by the officers of the Steam Reserve, and given to a captain on commissioning, or entered in the ship's books, which, as we have seen, give but meagre information on these points at present. We certainly have not yet considered the ship as a weapon which has limits to its powers, and requires a range table as much as the gun.

We will now take our ship into action. Our ship is a ram, with the armament of the "Hercules," and we will suppose her opponent to be identical in every respect. The speed and turning powers we will take as those of the "Thunderer" at 10.44 knots. Our tactics are ramming tactics, and the enemy is ready to meet us on our own ground.

In accordance with the maxim of La Gravière, the enemy does not fire his bow guns, and as yet we reserve our fire for an electric broadside. Both broadsides are ready, the guns prepared for ramming, and laid "Close alongside—abeam." Our object, on sighting the enemy, will be to steer towards him, but keeping him a couple of points on the bow. As we near each other, the enemy, whom we will call B, heads a little more towards us, and our ship, A, continues her course. B, being, however, desirous to ram, is willing to keep us a few points on the bow. At 2000 yards' distance we shall meet in three minutes, and the captain of that ship who shall not already thoroughly have considered his

plan of attack will find it rather late to improvise one. B, having read the works of Admiral Randolph and Captain Colomb, has assumed that the real tussle will begin after the ships have passed each other, and, beyond keeping his ship's head inclined towards ours and being prepared to ram on any broad sheer being made by A, he trusts to his guns for the first blow.

A proposes to attempt to ram from the first. He manœuvres so as to get B to steer an opposite course, whilst still keeping him 2 points or $1\frac{3}{4}$ points on the bow. The wind being from B, and towards A, the latter has intended to fire one round from his bow gun to cover his intended movement; the gun is accordingly laid for 900 yards, and when the mast-head angle shows that distance, it is fired.

Instantly the helm is put hard-astarboard. Covered by the smoke, it is half a minute before B has discovered A's move, and that he is in imminent peril from his opponent's ram. If he hesitates and stands on, in one minute more A has crashed into his side, there is one heel, and all is over.

By Fig. 2 it will be seen that the case we have supposed is correctly stated by the "Thunderer" experiment. A wishes to strike B at right angles, and if B allows her to mask her intentions so as to make it possible, he will put his helm over when B bears 17° on his bow, and is at 7580 feet distance. A has taken $1\frac{1}{2}$ minutes (89″ in experimental trial) to turn through 90°; she has advanced 1000 feet, and made a transfer of 700 feet. In the same period, B has run 1500 feet on a straight course, when the collision occurs at O. But it will be said B can easily frustrate this move. Let us see.

(1) B slows his engines with the intention of being rather behindhand at O, and so ramming A, for, as Captain Colomb has long ago pointed out, the difference between rammer and rammee lies in a half a ship's length. This is probably B's new course. All now depends upon A's *coup d'œil;* the time has passed for angles and calculations, and he must watch narrowly B's movements. B has probably slowed too hurriedly, and A elects to cross his bows. It is rather risky, as 300 feet must be gained on B. If successful, A is within B's circle; he fires his starboard broadside, and can commence the action again with the advantage of speed and quick turning power in his favor. We would remark that A at full speed can turn in 5′ 20″. B at 5 knots can probably turn in little less than 9′. Time is the true measure of distance in evolutions. If A considers it too dangerous to cross B's bows, he should right his helm and endeavor to give B an angular blow. Here he would have a great advantage in his speed, as even at an angle of 25°[13] with the course of B the blow would probably be

[13] Mr. Laughton, in his "Essay on Naval Tactics," shows that for a vessel of 8000 tons, assuming 5000 foot-tons to be the least effective blow, an angle of 10° would be effective at 12 knots, of 29° at 8 knots, and 72° at 4 knots.

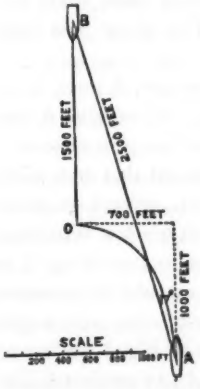
sufficient to sink his opponent, and at a smaller angle fatal damage to rudder or screw might result.

(2) If B elects to starboard her helm so as to turn towards A, the latter should cross B's bows, and immediately she is within the latter's circle make a second attempt to ram by suddenly reversing her helm.

If B is proceeding at 8-knot speed, A at 10.44 knots, A should turn when at 2300 feet from B, and the angle should be 19° on the bow.

Diagrams can easily be made for other speeds. In any case A receives a broadside from B, but by his initiative he probably is himself aware before his opponent as to which side will be first engaged. From the above we have endeavored to show the great advantage to be gained by assuming the offensive and acting on a prearranged plan. We would also point out the advantage to be gained by high speed in making your movements, and allowing no time for consideration to the enemy. Let us now suppose B to be too wary to allow A an advantage. He steadily keeps his bows towards A and continues at speed. We will not suppose that ships of equal strength will be Quixotic enough to ram each other bow-on, but we believe that they will go so close as to collide broadside to broadside, and it would probably be open to a skillful captain with a sudden double movement of the helm to gain a slight advantage by damaging the enemy's screw or steering gear.

FIG. 2.



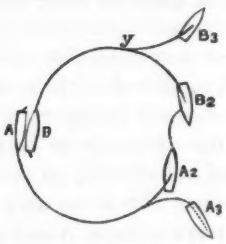
We will, however, suppose A and B to rub sides on equal terms. Both ships discharge their electric broadsides, A's guns being laid as nearly as possible for the water-line of the enemy. Strange to say, neither ship is sunk, and although Whitehead torpedoes are discharged, either from want of room to dive or from the waves caused by the displacement of the water, they fail to act.

A has succeeded in running alongside B's port side, as he proposes

to turn under his opponent's stern, and prefers starboard helm as more favorable for his left-handed screw.

The ships being clear of each other, A's orders are "Hard-astarboard, full speed ahead;" he turns across B's stern as in Fig. 3.

FIG. 3.



If B turns to meet him, A has the advantage of starboard helm and of being at least the width of B nearer to the centre of his circle than his opponent. He should accordingly be within B's circle, and have a chance of ramming.

We have no exact data on which to draw the figure, the "Thunderer's" trial not furnishing us with information as to the path of a ship starting from rest; but from some trials in the "Lord Warden" the radius of the circle would be about 490 feet, and we have drawn the figure accordingly.

Whatever radius we assume, A must be within B's circle and have an advantage accordingly. If we give A the initiative of even half a minute, there is an extraordinary increase of chances in her favor.

We need scarcely point out that once fairly inside the enemy's circle A is at liberty to slow, stop, or even go astern, either to ram, to bring her broadside to bear, or to use her Whitehead torpedoes.

B, however, may elect to turn to port under starboard helm, and should she do so the action would recommence on equal terms, assuming both ships to have put their helms over together.

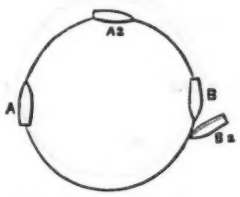
Let us turn once more to Fig. 3, and we will suppose B, finding that A will be within his circle, to starboard his helm at y, and when A arrives at A_2, B has reached B_3. She escapes the ram certainly, but A is only 250 yards astern of him, and unless his stern fire is stronger than A's bow fire, or her speed is greater than A's, neither of which is the case from the terms of our problem, she must fall a victim to A. She cannot yaw to either side without being in danger of A's ram.

Here we see two things: the value of speed—which would enable B to increase her distance from A, and to begin the action again on equal terms—and the advantage of having a powerful stern fire. It would be

most interesting to know how far a Whitehead could be depended upon if fired by B at A when in chase of him.

Should A and B agree to fight the action as an artillery and torpedo duel, as might not improbably prove to be the case after some ineffectual attempts at ramming, it would probably be found that they would ultimately be following each other round in a circle of 400 to 500 yards diameter. Once in this position, neither of them could use the ram except by stopping or turning astern, which would be extremely dangerous. See Fig. 4.

FIG. 4.



Let us suppose that B, wishing to ram, stops and goes astern; when at B she will probably be in the position of B_2 in $1\frac{1}{2}$ minutes.[14] But A in that time will have reached A_2, with the ship well under command. She is inside B_2's circle and has every chance in her favor.

It has been proposed by several writers that a moderate speed of 7 to 8 knots is advisable when going into action. Let us, therefore, examine the advantages and disadvantages of moderate and extreme speed.

A, we will suppose, goes into action at a speed of 10.4 knots, B at $7\frac{1}{2}$ or 8 knots.

A has the advantage of turning more quickly, but in a larger circle than B. The captain of A has more time to consider and counteract B's movements, but he must well have weighed the result of his own celerity of motion beforehand, or his own speed will be against him, and his gun fire will scarcely be so accurate as it would be at a lower speed. As, however, he only proposes to use his guns after a failure to ram, this is of the less importance.

Referring again to the "Lord Warden" table, we find that, comparing the eighth and twelfth trials, both with starboard helm, the former at 8-knot and the latter at 12-knot speed, while the diameter of the circle was only 5 yards less at the lower speed, the time was 2′ 1″ more. If we take the 5-knot speed trial under otherwise similar conditions, we

[14] Exact data as to the time and space required to bring a ship to rest under the action of the screw is, as we have observed previously, much required. From some experiments which we have been able to make in a large ironclad, we believe our assumption to be not far from the truth.

find that while the diameter of the circle is only reduced by 99 feet, or 33 yards, the time has increased fron 3′ 49″ to 8′ 53″.

In Fig. 5, A is supposed to be at 12-knot speed, B at 8-knot speed; under equal speeds, as we have seen, this case resolves itself into an artillery duel. In 3′ 49″ A has made a complete circuit, and is in her original place. B in 2′ 55″ has only gone round 180°, and in the 54″ remaining she will have advanced less than 200 yards, having her stern and port quarter guns to reply to A's port bow and chase guns. It is

FIG. 5.

evident that A should now have B in his power. If it is thought that this is an extreme case, we answer that it is taken from official records, and that it is a fair exemplification of the necessity for retaining speed in a single-ship action.

Let us now look at the advantage of better turning power possessed by B over A. If B, Fig. 3, is handier than A, she can frustrate A's manœuvre; but if A should find that B will be inside her circle, and, shifting her helm, turned off to A_3, if she has the advantage of speed, she can soon shake B off and recommence the action on equal terms.

From the above considerations the following conclusions may, we think, be drawn as regards ramming tactics in a duel between single ships:

(1) A high speed, if not the highest speed, should be maintained.

(2) Speed is of even greater moment to a ram than handiness or turning power.

(3) A powerful stern fire is at least as important as powerful bow fire.

We have treated of the ram as the most important—indeed, almost the sole—weapon. True, under certain conditions, as we have admitted, an artillery duel might be substituted for it. A ship having the advantage of speed, but not in turning power, might prefer to trust to her guns, keeping a respectful distance from her antagonist; but in doing so she will have to make some sacrifices, and be forced occasionally to turn her stern to the enemy. A ship with less speed and inferior turning power to another can only expect to be saved from being sunk by a lucky shot which cannot be admitted as a prime factor in the problem.

The advantages of boldly pursuing ramming tactics are well summed up in the pregnant words of Admiral Randolph:

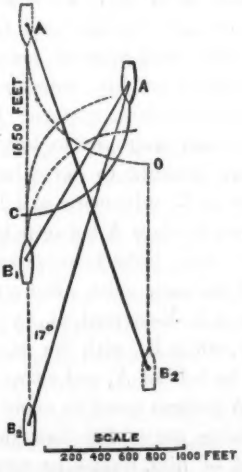
"A captain who makes this form of attack on a single ship his main object makes the best defense against it, and woe betide the artillerist who, by losing sight of the danger, even for the sake of all the 81-ton guns he may carry, gives an adroit and resolute ram his desired opportunity:" to which we may add, "*Audaces fortuna favet.*"

"Two against one, what are the odds?" We cannot do better than put the question in the words of Admiral Randolph, though our answer would not be similar to his. We may suppose that except in the case of a decided superiority of the single ship she would avoid an action. But let us first consider the chances when all three ships are on an equality.

Obviously, the single ship would endeavor to engage one adversary at a time. What formation would be the most likely to favor her in this object? Few will differ as to the answer. Line ahead of the two friends would be most to her advantage.

Let A be the single ship, B_1 and B_2 the two friends in line ahead at two cables apart. A steers so as to ram B_2. If B_1 attempts to ram, she must, as we have seen, put her helm over at 900 yards distance; but she has not done this, intending to give A a broadside in passing, and wishing to capture, not to sink, her enemy. A, at the proper time having got within 500 yards of B_1, swoops round upon B_2. She gives

FIG. 6.



and receives a broadside from B_1 in passing, but under cover of the smoke she has a fair chance of ramming B_2, and she has at all events haken off B_1 for the time (see Fig. 6).

There is one advantage, and only one, in line ahead. There is little danger of the friends running into each other or getting in each other's way. They give each other the minimum of mutual support, but, on the other hand, they are not hampered in their movements by those of their consort.

Echelon or bow-and-quarter line are neither of them much more satisfactory.

Let the B's be formed in bow-and-quarter line, B_2 being four points on B_1's quarters. In this case A's tactics would be to steer straight for B_1, and when at 550 yards distance, being in a position to ram B_2, she would put her helm over.

It is true that if B_1 put her helm hard-aport at the same time or immediately after A, they would all then reach the collision point, O, at nearly the same time, B_1 and A colliding broadside to broadside, while the former would be in danger of being rammed by B_2. (See Fig. 6, dotted lines.)

Should B_1 have failed to make out A's movement, which should be masked by gun fire, the latter has a fair chance at B_2 without interference from her consort. Broadsides would of course have been exchanged with B_1 in passing.

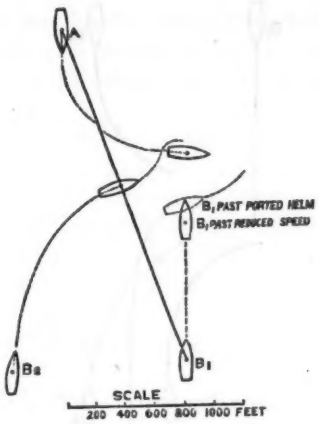
We have hitherto considered how not to do it, rather than the best formation for the two ships.

Let us now suppose the B's to be formed in line abreast. If at two cables' distance, as proposed by Admiral Randolph and Admiral Bourgois, who have considered this question scientifically, each ship can certainly offer some protection to the other, but want of space demands that they shall act together, and they would mutually endanger each other if they used opposite helms. The action of A in attacking one ship would be but little interfered with by the other.

We would propose, therefore, that the B's should keep in line abreast, 4 cables apart, and endeavor to keep A between them. We have seen that A must attempt to ram when at 900 yards distance, assuming all the ships to be advancing at 10.4 knots. The tactics of the B's would be rather to place A between two fires than to ram. A, on the contrary, as we have hitherto supposed, must make a desperate effort to rid herself of one antagonist. She attempts to ram B_1 (Fig. 7). So soon as her intention is discovered, B_1, by previous arrangement, reduces speed suddenly, while B_2, with the helm aport, swoops down on A. B_2 takes care to be behind A, and either rams her on the quarter, which is possible if A reduces speed to avoid B_1, or stations herself on her port quarter, making use of her bow guns. B_1, when quite sure of A's passing ahead of him, unless he sees a good opportunity for ramming clear of B_2, puts her helm aport and endeavors to place herself on A's starboard quarter. In this situation we may leave A a victim to her enemies.

Should A attempt to ram B_2, the tactics of the B's would of course be reversed. Should A show no signs of ramming, the B's should be

FIG. 7.



satisfied with giving her a broadside each at 200 yards 10° before the beam, and reversing the course instantly together in compliance with signal from the senior officer.

Two to Two or Three to Two.

In two to two we cannot follow the tactics of two to one. The ships must work together, or there is danger of two combining against one.

It therefore appears that they must keep within a short distance of each other, say one cable. The endeavor should be to keep the enemy's outer opposing ship 1¾ points to 2 points on the bow of A_1 (Fig. 8). When at about 1000 yards distance, both ships should circle round to attack the most distant of their opponents, combining on B_1. The B's being supposed to be 2 cables apart, B_2 would scarcely be able to interfere with A_1, and if the ramming attack failed, B_1 would be placed between two fires, and B_2 would have received an uncomfortable broadside from A_1 as the latter swept across his bows.

In three ships against two we would advocate the third ship being kept in reserve, two ships in line abreast, as before, the third being between the two leaders, and 2 cables' length from either (see Fig. 9), the *rôle* of A_2 being to occupy the attention of the ship not attacked by his consorts and endeavor to ram him, if possible.

It will be seen that we believe line abreast to afford better mutual protection than line ahead and échelon for two ships. Any échelon

partakes of the weakness of line ahead, whilst line abreast has the objection of masking each other's fire.

FIGS. 8, 9.

Admiral Randolph, in one of his admirable instances of a naval fight, has acknowledged that under some circumstances line abreast has an advantage over even his very open échelon, whilst Admiral Bourgois,[15] who advocates the line abreast *pur et simple* on all occasions, points out that in all bow-and-quarter lines the leading ship can only afford protection to his friend when the latter is at an angle of 4 points on his quarter, and that no mutual protection can be afforded.

It by no means holds good, however, in our opinion, as a corollary, that line abreast is the best formation possible for a fleet because we believe it to be the best for two ships. We are no theorists, and we do not pretend to have found an immutable law.

Circumstances alter cases; and if it is expedient to compare great things with small, there is no greater error than to seize upon a so-called principle or rule, and by false analogy to endeavor to apply it where it has no real bearing.

CHAPTER III.—*Evolutions—Fleet Organization—The Signal Book.*

Evolutions are not tactics, though they may form the basis on which tactics are founded. Evolutions are simply fleet drill, and the Signal Book is the drill book. Whether it is a manual of naval manœuvres,

[15] *Revue Maritime et Coloniale*, 1876.

as its transcript, commonly termed "the Manual," would lead one to suppose, we shall inquire hereafter.

We propose now to consider whether the evolutions and manœuvres, as carried out in accordance with the Signal Book, are based on a sure foundation, whether officers instructed in the evolutions as now performed in our fleets are thereby rendered proficients in manœuvres which may be utilized in real combat, or if they are complicated evolutions savoring more of the barrack-yard and pipeclay than of more important considerations.

We do not wish to dispute the importance of even a drill sergeant's knowledge,—this, however, in a ship should be possessed by each individual captain,—but we ask that each evolution shall be ordered to be carried out in the most thoroughly effective manner; that it should, both as regards time and precision, be all that can be desired. Further, that it should be simple, avoiding any unnecessary complication of words or ambiguity of expression.

First, then, let us look at the principles underlying all our fleet evolutions.

The first principle is that of rectangular movements, to be used in ordinary cases of change of formation of a fleet once formed in any order. So strongly is this view held by those in authority that the famous Admiralty Minute on the loss of the "Vanguard" censured the admiral for not having formed two columns by such a change of order, instead of making the signal for "two columns," leaving the ships to get into station as they best could.

It is remarkable that Admiral Comte Bouet-Willaumez of the French Navy, who claims to have originated the rectangular movements authorized by the French tactics of 1861, should have reconsidered his opinion, and in accordance with his views the French system was again altered, all rectangular movements being eliminated as unsuitable for rams.

His reasons for such a change of front having considerable interest, we give them in his own words:[16] "What I propose to-day . . . is to substitute for flank movements evolutions in oblique lines, which are more appropriate to the strength of the ships, viz., to their bows, than to their weakness, viz., the side, pierced with ports, and on which a blow from a ram, striking normally, might cause a disaster."[17] He further remarks that the chances of collision by the oblique movements are smaller.

Here we must agree that the French admiral has shown a proper conception in looking to evolutions as applicable to fighting tactics, though his logic may have carried him too far.

[16] "Tactique Supplementaire." Published by Ed. *Revue Maritime et Coloniale*, 1867.

[17] A translation was made by Admiral Phillimore in 1862.

In contrast to our system, the French plan of Bouet-Willaumez is here produced, and we cannot help admiring its conciseness, its simplicity, and apparent completeness. These evolutions were all performed in turn by the evolutionary squadrons, under Bouet-Willaumez, in 1865–1866, consisting of 6 and 9 ships.

Total number of evolutions, 20.

From line ahead—

4 { Form line abreast.
Line ahead in pelotons.
Line abreast in pelotons.
Two columns.

From line abreast—

4 { Form line ahead.
Form line by pelotons.
Form line abreast by pelotons.
Form two columns.

From line ahead in pelotons—

4 { Form line ahead.
Form line abreast.
Form line abreast by pelotons.
Form two columns.

From line abreast by pelotons—

4 { Form line ahead.
Form line abreast.
Form line ahead by pelotons.
Form two columns.

From order of sailing in two columns—

4 { Form line ahead.
Form line abreast.
Form line ahead by pelotons.
Form line abreast by pelotons.

This the French admiral considered as all that was needed. He gives the times of performing the different evolutions, which certainly seem fairly good, but it must be recollected that the fleet was not large, and that it had plenty of practice.

The pelotons referred to were in the form of an equilateral triangle. It is worthy of remark that Bouet-Willaumez was the originator of the peloton, not for fighting purposes, but as "an habitual order for navigation," so as to take the place of lines of ships in each other's water, "an order compromising for steam ships, especially at night."

The equilateral triangular peloton, as a "*peloton de combat*," be-

came, however, subsequently usual in the French Navy, and is so referred to by Lewal and others.

As regards the method of performing the above evolutions, the only instruction given is, to gain your new station as soon as possible "*chasser son poste.*"

That French naval officers, from the time of the Prince de Joinville to the present day, have been adepts at station keeping, and we may presume at performing evolutions, is universally admitted; but unless their qualities in these respects are really far superior to those of our own officers, it is difficult to believe that any exact or rapid performance of evolutions is possible under such free-and-easy regulations as the above.

That all is not entirely satisfactory in the French Navy the following extract from M. Lewal's work will show, but it is fair to admit that the writer is impressing upon his brother officers the necessity for an exact calculation beforehand of the course to be followed by them in all cases, and he probably exaggerates the mistakes made. Making every allowance, however, his words are very decided:

In speaking "of Exercises," he says: "In this period of doubt and indecision of minds, no one has established principles nor any fixed plan of manœuvre or evolution; every captain must suspect his neighbor, and is preoccupied by the fear of being run into or running into others. There is no decision, no precision, in manœuvres. Every one wishes to know what his neighbor will do; the helm is not put over instantaneously, nor rapidly, nor at once at the required angle, as it should be. As the result of these hesitations, simultaneous movements cannot succeed, etc."

Now this we must admit is what we should expect to occur, nay, what does occur, in a British squadron, where each captain is left to his own judgment to reach his station. It must be remembered that one ship badly handled may throw a whole line out, and it is, in our opinion, wise to prescribe as closely as possible to each captain the course to be followed. This is what is done by our code of evolutions. No admiral would attempt an evolutionary change of formation when in action with the enemy, and this objection is of no weight in practice.

Our principles, then, of rectangular movements which allow of changes of formation being made without variation of speed, are, we hold, correct.

Let us now examine them further in detail. We find, further, that while the principle of rectangular movements is maintained throughout the evolutionary code, and the distance apart of columns (we use the word in its Signal-Book sense) is so ordered as to make the transition from any one formation to another possible by this system, abundant elasticity has been left. Thus, where the change of formation

can be effected more expeditiously by a leading or wing division or ship continuing its course, the option on this point is left to the admiral; we find, too, that the simple signals directing a certain formation to be taken up, but without indicating how the ships are to carry out the evolution, are retained, to be used when the fleet is either formed or not in any order, but chiefly, as we have seen from the "Vanguard" circular, intended to be used in the latter case. Still, the option is left; and it would be of great advantage if the admiral of one of our evolutionary squadrons were to perform a certain number of simple changes of formation by the rectangular and what we may call the "happy-go-lucky" plan alternately, timing each, and reporting as to the accuracy with which each of them enabled the evolution to be performed, and the time occupied, though we can have little doubt as to the result. The difference of principle is happily explained in the "Manual," pages 24–30. The author points out how the advantages of the rectangular movement increase with the speed of the fleet, and sums up by showing that—"Only when there is reason for keeping the leader on the right and an objection to taking ground to the right, or a reason for keeping the leader on the left and an objection to taking ground to the left, can the method, Fig. 2 (leaving ships to get into their stations as they best can), be admissible as a rival to the rectangular movement."

The authors of the numerous recent editions of the Signal Book have further shown themselves by no means niggard of signals; there has been little attempt at logical completeness, and conciseness has been sacrificed to clearness. It would be easy to dispense with nearly half the signals by adding a note, but the authors have wisely discarded notes, so that each signal stands out clearly and distinctly by itself. Thus we have numerous signals, each conveying its own meaning rather than exact classifications.

We are not, however, now criticising the Signal Book, but examining the system of evolutions or drill in use in the fleet. This we have seen leaves little to be desired. Let us now examine the requisites for enabling evolutions to be accurately performed. The first necessity is naturally that stations shall be accurately kept. If ships are not in good station, rectangular manœuvres are impossible without serious danger.

In our evolutionary fleets all ships are now furnished with a table of coefficients of speed or comparative number of revolutions. It has not yet, however, been considered necessary that coefficients of helm or comparative helm angles should be ascertained. We cannot help thinking that this is equally necessary with the table of revolutions. Both can fairly be ascertained by ordinary observation, both require considerable allowances to be made in practice; but few officers will now hold that the former is useless, and we believe the latter to be equally important.

In computing the requisite number of revolutions, allowances must be made for the previous speed of the ship and the special circumstances of the case, such as a bluff-bowed ship requiring more power to press her against a head sea, and other causes. In helm angles, likewise, similar allowances have to be made, but the necessity for some firm basis from which to start is apparent.

The writer, who is one of the "fortunate officers" alluded to by Admiral Randolph, who has served in recent evolutionary fleets, has observed that when the admiral of a fleet was himself in a long, unhandy ship he never seemed to remark on her steering, and "all went merry as a marriage-bell;" when the contrary was the case, there were considerable searchings and inquiries as to the unwieldy length of the defaulter; and we have had a recent instance in the "Alexandra" and "Achilles" collision, showing that the bad steering of the latter, although necessarily known, was not sufficiently appreciated. We hold, therefore, that each ship should have a table of helm angles corresponding with the hard over and other angles of helm of the longest ship in the fleet. Assuming this hard over to be 32°, half helm should be 25°, and easy helm 15°. Each ship should have a table of helm angles corresponding with those here referred to. Whilst on the subject of helm angles, it may be worth while to refer to a practical question of great importance, showing the extreme difficulty of accurately manœuvring ships of different sizes and qualities in the same fleet.

It must often have been observed how a short, handy ship gains upon a long ship in turning, which is probably due to the decreased helm angle. M. Lewal has shown from some experiences of the "Solferino" and "Provence," at 9-knot speed, the latter with 24° of helm had her speed reduced to 7.7 knots; while the "Solferino," with 34° of helm, only went 6.4 during the curve.

Every ship, too, should have a dummy compass in some convenient place on the bridge, where relative bearings can be observed. We have also found a board, marked out in squares of 2 cables' lengths, with leader ships, very useful for block drill; and we would recommend a deviation table, something in the nature of Smith's table, but with the point to be steered by standard compass opposite the true magnetic course signaled, so that no calculation of deviations may be requisite. In general, any helps which may enable officers to give their whole thought to the special facts which must complicate every evolution are of value, and we have accordingly indicated a few. The steering signals and speed signals now in general use are all of great assistance, though it is probable that they would have been looked upon as unnecessary complications twenty years since.

The ship being in station, there should be no hesitation as to the helm, which should at once be put over to the proper angle on the signal or preparative being hauled down. Here we see the beauty of

the rectangular movement. Evolutions based on these principles leave no room for hesitation,—a decided course must be at once adopted; and while, as we have seen, they are admirable in themselves, they have the indirect advantage of inculcating the practice of decision, which is of immense importance to those whose duty it is to learn, in the words of Jurien de la Gravière, to "navigate in a limited space masses of 6000 or 7000 tons, which cannot come into collision without mutually smashing each other." After all, and theories apart, what is wanted is nerve and a good digestion.

With these, a knowledge of the Signal Book, the ship in station, orders given decisively and promptly carried out, all evolutions requisite, and which the Signal Book allows, can be performed with perfect confidence and without danger.

They are not, as we have endeavored to show, unnecessarily complicated, and they are certainly well adapted to keep a fleet under command in readiness for the more distinctly tactical formations which would be required in action.

It would be unnecessary to spend much time in examining the question of fleet organization but for the vexed question of groups.

In the ordinary organization by divisions, we find that the fleet may be divided into "one, two, three, or more divisions at the discretion of the admiral in command, according to the number of ships present, and the circumstances of the service. Each division is to be divided into two subdivisions." On this we need only remark that an admiral in war-time would have to give much consideration to the special nature of his ships, as it would be obviously inadmissible to place them entirely in accordance with the seniority of the captains, as is now usually done, the ships being mixed up regardless of their powers; thus we may have a division consisting of the "Hotspur," "Achilles," "Black Prince," and "Research," and another of the "Minotaur," "Penelope," "Thunderer," and "Warrior." It is evident that the admiral will find great difficulty in adjusting the reasonable claims of different officers whilst placing his ships in a suitable fighting formation, and we can only suggest that these subjects should receive some consideration from the Admiralty in dispensing their patronage.

We do not suppose that modern fleets will ever be very large, so we will take 12, 15, and 18 ships as probable numbers. Should the admiral think it advisable to fight his ships in groups of 2, he could divide his 12 ships into 3 divisions and 6 subdivisions. Should he prefer groups of 3, he will divide his fleet into 2 divisions and 4 subdivisions.

Similarly, with 18 ships he would have 2 divisions with 9 subdivisions, or 3 divisions with 6 subdivisions. With 15 ships he would have a large choice, viz., 2 divisions and 4 subdivisions, or 3 divisions and 6 subdivisions.

It is scarcely necessary to point out that the first question which the admiral would propose to himself would be what should be his squadron or group unit. The answer would probably be that the unit should be larger in proportion to the size of the fleet; thus, while with 6 or 8 ships it might be preferred to fight in pairs, with 12 or 18 ships, 3 would be a more reasonable unit, while, with a large fleet, 4 or even 5 ships should form the group unit. This we hold to be the right principle; with 15 ships, for instance, we should divide the fleet into 3 divisions and 6 subdivisions, consisting of 3 and 2 ships alternately.

It will be seen that, whilst we speak of groups, we do not consider a group as essentially 3 ships in a scalene triangle, as usually understood in the navy at the present time. Such a hard-and-fast rule is, we hold, unreasonable and inconvenient. There is no special virtue in the number three, and there is no extraordinary strength of formation in the scalene-triangle formation, to which we will revert presently.

The Signal Book and Manual, which is now, we regret to observe, a mere transcript of the former with a few extra notes and observations, distinctly lays down that there must be two systems. "One system is termed fleet organization, and the other group organization." Now, with every deference to the experienced officers who have come to this conclusion, we cannot but consider that this is entirely unnecessary, and that the subdivision should be the group or unit of organization.

It would almost seem as if two hands had been at work, one insisting on the group as consisting of 3 ships in scalene-triangle formation, and the other determined to show the folly of this by drawing up the above instruction.

It is certain that from our point of view, and from the point of view in which the question has been regarded in the French Navy, the double system is a new complication marring the simplicity of the fleet organization, and resting only on a sort of fetichism that a group must necessarily consist of 3 ships. Now, the virtue of a group consists, in our opinion, in the breaking up a fleet into a larger number of groups or pelotons of ships, and thus rendering it more mobile. With the greater flexibility and handiness of a steam fleet this became necessary, and it answers to the development of skirmishing movements in the sister-service. In former days, when once the fleet bore down upon the enemy, the Signal Book was closed; it was almost certain that after an engagement was in progress ships would be disabled, and beyond a general muster of the least damaged ships to protect those which had been most ill-treated, little manœuvring was possible or requisite. Now, on the contrary, in bearing down on the enemy, changes of course involving possibly changes of formation may be required, and while the speed is high smoke will in many cases obscure the view, rendering long lines of ships impracticable, and a clear view of admirals difficult.

When later on in the engagement the lines are broken, although

La Gravière may be quoted as saying "the book of signals can without fear be shut, the responsibility of captains commences," we believe that rallying points will be required, and that the leaders of groups will form such rallying points. From this point of view, 3 ships certainly form a reasonable number, and this is, we suppose, what Mr. Laughton refers to when he speaks of the plan of groups having been that under which the English opposed the Spanish Armada. To owe special allegiance to a particular senior officer who can easily be kept in view, to act with him and to support him on all occasions as a brigadier, is, we hold, a good fighting principle, and by no means tending to disintegration of the fleet, as has been held by high authority. If we compare it with the army, the ship is the battalion, the group the brigade, the division the division, and the fleet the "corps d'armée." A very large fleet would be divided into more than one fleet, as proposed by Captain Fleetwood Pellew in his book on fleet manœuvring, published in 1868. Thus we have our organization complete.

But we cannot leave the question of groups without dealing with what should, we hold, be one of their intrinsic virtues. The idea is that the group of three acts as a single ship, that Nos. 2 and 3 should follow No. 1 as they best can (it is somewhat vague, certainly, but no further instructions have ever been given), and that, whatever changes or evolutions may be performed, No. 1 is at the head of his group, acting as leader, while Nos. 2 and 3 are his supports. The theory sounds plausible, but we have gradually lost this principle from the difficulty in practice of manœuvring a group as one ship; and now, in the new Manual, at least, we have it authoritatively stated that, when ships are in "group formation," any signal which entails "an alteration of course is to be acted on by all the ships in each group together, unless otherwise ordered, and group formation is not to be resumed till the signal to that effect is made."

Now, here we have the original principle of the group ignored,—Hamlet with the principal part omitted. It has all "eventuated" in our old friend, "alter course together."

A few years ago, in the desire to develop the group principle, we elaborated a scheme for group evolutions which was sent to the Admiralty, and has since probably occupied a convenient pigeon-hole,—most likely, as good a fate as it deserved. We only allude to it now to mention what we then endeavored to prove, viz., that rules could be formulated for the conduct of each ship in the group in making a change of course, our principle being that No. 1 should always alter to the new course immediately, the other ships getting into their stations by certain prescribed movements. With an alteration of more than 5 points, the whole would turn to the new course together, Nos. 2 and 3 changing places and numbers. In carrying out a change of formation, the fleet being organized in groups, it is obvious that it is advisable

for every ship in the group to turn together, so as to be again in a correct group when the evolution is completed.

We are glad to find that the Manual, in reversing groups 16 points to port or to starboard, rejects the tempting heresy of changing 1 and 3, and makes only 2 and 3 change, the leader remaining No. 1, as we proposed.

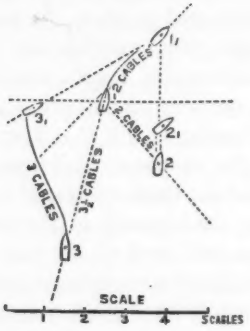
In the Channel Fleet, under Lord John Hay, a most elaborate system of group movements has been recently adopted, the experience so gained being of the highest value, as showing what can be done under different circumstances, and on different principles, with groups. Both principles of movement, viz., the altering course together and what is, as we have endeavored to show, the more correct one of the group moving as a single ship, were in use. Groups to starboard, groups to port; 2 and 3 changing, 1 and 3 changing, etc. To prevent inextricable confusion, the plan was adopted of always retaining the original numbers, and hoisting C 2, 3, C 1, 2, etc., when groups had to be re-formed, C being the temporary leader, the second flag showing the temporary No. 2, and the third showing the temporary 3.

There is no denying the ingenuity of the above schemes, and captains and signal officers had need of all their intelligence to carry out the movements, though we were rather reminded of the old "Excellent" puzzle of "man both sides," "change rounds," "change watches," etc., and the final poser, "Where are you now, No. 1?" would have been very apposite in many cases. Still, the evolutions as drill were undeniably useful, and in altering course as a group the admiral's instruction was sound: the helm, he said, was to be used to get on the proper bearing from the leader; the speed had to be regulated to maintain the distance. The requisite alteration of speed and proper helm angle might, we think, have been explicitly laid down, but this was not attempted. In any case, a considerable reserve of speed must be at hand in group movements.

The subject of the proper way to move a group is in itself a study, and we have no space to do more than give a sketch of the different theoretical principles which should guide us. Rejecting the "alter course together" as inapplicable to groups, we can obviously alter course either by the wing ship as a pivot or by the leader of the group. In the former case the rules as to helm and speed would be simpler, but the evolution would take longer. By the following figure it will be seen that rules could be given for altering course by pivoting round the group leader; the case we have taken supposes the group to be proceeding at 8-knot speed, and alteration of course to be 4 points. The rule should be, No. 1 to alter course at once, under half helm (25°); 2 would do the same with extreme helm (32°), while 3 would stand on and alter course under small helm when getting into her leader's wake. If we now assume the leaders not to reduce speed, No. 1 will have

probably advanced 2 cables in 1½ minutes before getting on her new course, the loss of time due to decreased speed while making the circle; this, however, will be made with her moderate helm, but it will serve to assist No. 3. No. 2, in the same time, should only go one cable, and she should accordingly stop with her helm hard over till nearly in her station, and then resume her original speed. No. 3, on the contrary, has to go three cables while No. 2 goes two and No. 1 goes one. She should therefore, theoretically, sheer a little to port, and then turn to starboard under half helm, and she would require to go

FIG. 10.



at 12-knot speed. Practically, an increase of speed to that amount, even in a very fast ship, is unattainable; the direction, therefore, to No. 3 should be to proceed on her former course at full speed, and to turn gradually to her new course when getting in the wake of No. 1. The directions for each ship might be accurately given in the Signal Book; and if groups are to be retained, directions for alterations of course should be given in detail, as below, for each change of course of 4 points:

Altering course less than 4 points, to be given in Signal Book.

Ditto 4 points and less than 8 points, as above proposed.

Ditto 8 points and less than 12, to be given.

We must spare a short space for the examination of the tactical value to be attached to the scalene-triangle group formation.

It has come to us from such high authority,—that of Admiral Sir Thomas Symonds and the late Commodore Goodenough,—and it is supported by Sir G. Hornby, and such a general consensus of naval officers that we should like to speak of it with all respect, yet, upon a careful consideration of its merits, we are forced to reject it. Even as regards authority, there is a good deal to be said against it; Bouet-Willaumez, as we have seen, never proposed it as a fighting formation. Admiral Bourgois distinctly objects to all "*formes triangulaires*," the leading ships being, in his opinion, unsupported. In our own navy, Admiral

Randolph ignores the recognized group as a tactical formation, and Captain Colomb, who has given more study to naval tactics than any other officer, is unfavorable to it.

In our view, in the form adopted in our navy, it is an attempt to create a formation combining some advantages of the ram and the broadside fire, and as such it is a failure. It is certainly difficult to see why, if the 4-point position, for instance, is the best for supporting the leader against a ram attack, the protection is only to be given on one side or, *vice versâ*, if the position of No. 3 is considered the most advantageous. The French "*peloton d'attaque*" is certainly more logical, and we prefer it on the whole as a better fighting formation, and it is certainly easier to keep accurately.

In this wise we do not see any great advantage in the group. The best form for a triangular group would be, we believe, the French peloton reversed, Nos. 1 and 2 being abeam of each other, and No. 3 forming the apex of an isosceles triangle between them. Where the Nos. 3 could be formed entirely of rams, the latter being half as numerous as the other ships composing the fleet, we believe the above to be a good tactical formation, but it discards altogether the idea of the wedge, which has generally been associated with the triangular group. In dealing with evolutions, fleet organization, and the group system, we necessarily had occasion to refer frequently to the Signal Book, but the Signal Book, as our code of evolutions and tactics, demands special consideration. We have seen that it is an efficient drill book, but how much farther does it go in the higher questions of fighting requirements? Before, however, touching on this important point, a few remarks on the definitions and other principles embodied in the Signal Book may not be considered superfluous. Of the flags and general method of signaling by day, and the flashing signals by night, it is unnecessary to say much. The latter, by their intrinsic merit, have won universal acceptance in the Service of recent years, while the former have been the same since the beginning of the century, all well-meaning reformers having retired discomfited with their schemes of radical change. It is among facts not generally known that our flags, with but one or two exceptions, are made on the principle of dark and light colors, and it would be almost equally easy to decipher them if all red, black, and blue colors were black, and all yellow and white, white.

The story of the officer whose knowledge of flags was limited, reading a "hoist" as "the five of clubs, the ace of spades, and the chequer board," shows that he at least had not discovered the necessity for color. We will, nevertheless, point to two flags where improvement might be made, the C and D: the former, especially when old, wants color, and should be relieved by a dark-colored St. Andrew's and George's Cross; the latter or pilot jack might have a broad red border instead of the white one now used.

If we turn to the definitions, we see that a great improvement has taken place in recent editions of the Signal Book, the terms, "guide of a fleet," "guide of a column," and others, being comparatively new. The term "columns" is also now used to mean "Any number of ships in a distinct body, whether in line ahead, line abreast, or otherwise." The word has been objected to, with justice, as having a forced meaning, but at least it describes clearly a body of ships in any formation, and this was previously much required.

We have certainly much improved since a distinguished flag officer some twenty years ago, who had had some hand in remodeling the Signal Book, could point to such a definition as the following, which has rested in our memory on account of its very vagueness and ambiguity: "The formation or disposition of a fleet is termed its order." In other ways we see decided improvements in the new Manual. In the Signal Book now about to be superseded, it required a practiced hand to find the requisite articles in the instructions; thus we had:

(1) Instructions for the organization of a fleet, XVIII. articles.
(2) Instructions for the conduct of a fleet, XII. articles.
(3) Action—General Instructions, X. articles.
(4) Evolutionary—General Instructions, XV. articles.
(5) Evolutionary—Forming or Changing Orders, VI. articles.

Or a total of 61 articles scattered somewhat promiscuously about the book.

It was certainly an improvement to reduce these instructions for guidance to two headings in the new Manual; viz.:

Instructions for the organization of a fleet, XXIII. articles.

Instructions for the conduct of a fleet, XLVIII. articles; or 71 altogether.

We find several minor improvements in the new Manual, especially in the "manner of using distinguishing flags" and in the "compass signals," which were certainly faulty previously; but there is one article, the "bearings and distances" of ships in column, which are now directed to be taken from the commander of the column in whatever formation the ships may be in, against which we may protest, as the commander of the column may be in the rear of the line, or he may be the outer ship in a change of course involving a wheel; this is clearly a mistake, and we prefer the previous instructions on this point in the older book.

In some respects, we observe that old articles now obsolete in their application to steam ships are still retained; thus Article XXIV. in "Instructions for the conduct of a fleet," which speaks of a ship "neglecting to put in stays, or to wear, etc," is still our only warrant for passing a ship which fails from whatever cause to keep her station. Something less vague is obviously requisite. Most captains have experienced the difficulty of "combining the information" gained from the two articles, one of which enjoins them to be 2 cables from their next

ahead, and the other directs them to take their position from the leader of the column, especially should the ship "next ahead" keep indifferent station.

On this subject, we may remark on the much greater difficulty of keeping anything like good station when in "open" than in "close order," and, now that "close order" is specially ordered in a fog, it is abundantly clear that it might and should be maintained under all circumstances, by night and by day, except in very bad weather, when ships are lying to, and not under command.

We are reluctant to push our remarks upon the Signal Book much further, but it is impossible to deal with evolutions or tactics without showing how, in our estimate, it may be improved. We feel bound, therefore, to point out the weakness of the technical definitions of formations. Thus, when "columns of subdivisions in line ahead" are formed, the diagram attached to the signal shows that the subdivisions themselves are ahead and astern of each other, no other distribution of "columns of subdivision in line abreast" being apparently contemplated. Similarly, in forming "columns of subdivisions in line ahead," it appears that the subdivisions themselves are always supposed to be abeam of each other. If these columns of subdivisions, whilst still in "line abreast" or in "line ahead," were to be ranged in bow and quarter line, the situation would be unknown to the Signal Book, and we fail to explain our meaning in technical language. We would, therefore, suggest the following definitions:

"Columns in line ahead are said to be in 'direct order' when the lines are abeam of each other, the first or leading division being on the starboard side. Columns in line abreast are said to be in 'direct order' when the lines are astern of each other, the first division being the leading division.

"Columns in line ahead are said to be in 'direct oblique order to the right' when the lines are ranged in bow and quarter line, the first or leading division being ahead and to the right.

"Columns in line ahead are said to be in 'direct oblique order to the left' when the lines are ranged in bow and quarter line, the first or leading division being ahead and to the left."

Similar definitions may be given for lines abreast in "oblique order." "Reverse order" to be the reverse of "direct order."

With these definitions we might considerably increase the number of tactical formations in use with advantage. At present the Signal Book does not acknowledge an échelon of columns of divisions or subdivisions, either in line ahead or line abreast, which is, we think, a decided omission.

We have hitherto remarked on the Signal Book viewed only as a book for drills and evolutions, but as it is also our only code of tactics it is necessary to examine it in that light. We may premise that we

are speaking of the old Signal Book now about to be superseded, and that many of the omissions to which we shall have to refer may not improbably have been supplied in the new books shortly to be issued to the fleet. They have been very properly omitted altogether in the new Manual.

Alluding, then, solely to the old Signal Book, we ask if we are right in supposing that all these signals, evolutions, and manœuvres are intended as a groundwork for tactics, and if so, where are the tactics? Admiral Randolph asks the same question; he says, pointedly, "But are even the evolutions prescribed for the squadrons sufficient? If battle is their object, where are the formations or plans of attack which they teach or recommend?" But one answer can be made: "We have been living in peaceable times, and battle and action signals have been dropping out of the Signal Book." What remains? Just ten articles of instructions for action, which are mostly obsolete. We give Article VIII. as a specimen. After some sensible directions about disabled ships, it continues: "And any fire-ship in a situation to admit of its being done is to endeavor to burn the enemy's ship opposed to her, and any small ships that may be near are to use every possible exertion for her relief, either by towing her off, or by joining in the attack of the enemy, or by covering the fire-ship, or, if necessity requires it, by taking out the crew of the disabled ship, or by any other means which circumstances at the time will admit." It would be no doubt difficult to recast the above in a modern form, which is probably the reason why it stands in all its chaotic confusion, like an old building which cannot be touched without falling to pieces. When we add that in the "Action Instructions" there is no mention of rams or torpedoes, and that in the few signals allotted to action there is only one which alludes to "running down" the enemy, and one mention of a "torpedo" (apologetically coupled with "or incendiary") vessel, it will scarcely be contended that any attempt has been made to adjust the code to modern requirements for battle.

This is no doubt the true answer to Admiral Randolph's question. Modern naval warfare has so changed, and is in such a state of transition, that, failing a direct order from higher authority to deal with tactics, modern Signal Book Committees have agreed to ignore them, except so far as an occasional verbal change in an old signal might adapt it to modern warfare.

[The remainder of the third and the fourth and concluding chapter of this Essay, treating of Strategy—Tactics—A Naval Action, will appear in the next number of THE UNITED SERVICE.]

EDITORIAL NOTES.

THE situation in Afghanistan continues to be the focal point of interest as respects the politico-military affairs of Great Britain. The new ministry finds itself placed in the position of having to choose one of two courses of procedure, with a moral certainty that whichever it elects it will wish that it had taken the other. It can neither remain in the country with profit nor withdraw from it with honor. The question that now vexes the ministerial mind is whether to establish a protectorate over Candahar, or, letting Candahar shift for itself, to retire behind the unrectified Indian frontier, take an account of stock, and, gathering the things that remain, leave the Czar and the new Ameer to hold such sweet converse as may suit their inclination. Whatever may be thought of British policy in Afghanistan, and however dreary may be the summing up of political results, there can be no denial that in the last campaign British arms have taken on an added lustre, and the brave officers and soldiers who have undergone the dangers and fatigues of Afghan warfare can justly feel that their part has been well performed.

IF there were any great principle at stake in the war now waging between the republics of South America the world might not have grown so heartily weary as it has of the prolongation of the struggle. But it is at most only a cock-fight for the possession of a guano-pile, and from the first Chile, the plucky little bantam among the cocks, has had things pretty much its own way. The latest advices indicate that the movement on Tacua, which we noted in our last issue, resulted in another victory for the Chilians, and the next intelligence will probably be of the fall of Arica and Callao, which, let us hope, will mark the termination of this protracted contest.

GENERAL HATCH, despite his energy, faithfulness, and skill in the campaign which he is making against the Southwestern Indians, does not escape the reprobation of the ubiquitous censor who

"Never set a squadron in the field,
Nor the division of a battle knows
More than a spinster,"

but who for all that has no hesitancy in condemning what he is incapable of understanding, and of insisting on the adoption of measures which all experience has shown to be worse than useless. This class of critics has one infallible panacea for all the difficulties that attend Indian campaigning,—the employment of volunteers. Their argument is that regular troops cannot fight Indians successfully, and that the "hardy frontiersman" is the only kind of man that can. This argument, or assertion rather, has peculiar charms for the average civilian, whether he be near to or far from the scene of hostilities. To the former it holds out the prospect of employment, pay, and rations; to the latter, who thinks of the frontiersman as a "Leatherstocking" or a Boone, its mere statement carries the force of conviction. Those familiar with the frontier of to-day, however, are aware that the typical frontiersman of history and fiction has either no existence, or exists only in such limited numbers as to make him inappreciable as a dependence for purposes of war. The volunteers whom these carping critics would have us substitute for regular soldiers in Indian warfare are the loungers in the saloons and brothels of mining towns, men who left their country for their country's good when, taking counsel of their necessities, they "went West," and who are equally devoid of the courage and the intelligence which are essential to successful war with a foe so wily as the Indian savage. That such volunteers would be more effective than the trained and experienced soldiers of the regular army in this particular kind of fighting is a claim which has never yet been, and, in our judgment, never will be, made good.

By the time this number of The United Service reaches our readers the Howgate Arctic Expedition will be on its way to the frigid field of its labors, bearing with it the good wishes of every friend of human progress and enterprise throughout the civilized world. The *personnel* of the party which remains at the station is as follows, so far as selected up to this date:

Commander, Lieutenant A. W. Greely, Fifth U. S. Cavalry.

Secretary, Henry Clay.

Assistants, Lieutenant G. C. Doane, Second U. S. Cavalry; Lieutenant W. H. Low, Jr., Twentieth U. S. Infantry.

Surgeon and Naturalist, Dr. Octave Pavy, Acting Assistant Surgeon, U.S.A.

Astronomer and Meteorologist, O. T. Sherman, Signal Corps, U.S.A.

Assistant Meteorologists, Geo. H. Robie, W. S. Jewell, O. Aldrich, Signal Corps, U.S.A.

Photographer, Geo. W. Rice.

Working Party, Sergeants Francis Stewart, D. L. Brainerd, F. E. Server; Corporal Daniel Starr; Privates James Ryan, Nicolas Saler, Geo. B. Richardson, Frank Stoetzel, J. Frederick, W. H. Johnson, Second U. S. Cavalry; Francis Long, Ninth U. S. Infantry.

Carpenter, E. Smith, General Service.

Two hunters and dog-drivers are to be taken from Rigolet, on the coast of Labrador, where the vessel stops for sledges, dogs, and clothing, contracted for last year by Captain Howgate.

The officers and crew of the "Gulnare" will be detailed from the naval force, but at this writing their names have not been announced. It is understood, however, that Lieutenant Marix will have command, and that one of his assistants will be Master Young, of "Huron" fame.

The United States may well feel pride in the composition of the party so far as named. Officers and men are hardy, resolute, and determined to do all that men can do to exalt the honor of the American flag, and Captain Howgate may be pardoned a feeling of pride in the organization of a work to which he has given so much time, thought, and money.

The President, in accepting the "Gulnare" from Captain Howgate for the use of the expedition, says, "I desire to express to you my appreciation of the persevering devotion and untiring zeal with which you have labored for the success of this undertaking. It will be a source of patriotic pride if to American enterprise and generosity the honor may yet be due for the practical solution of the important scientific problem which is the object of the expedition, and which has for so many years engaged the attention of the scientific world. I trust your efforts may be crowned with success."

The sentiments thus expressed by the head of the nation will find a responsive echo in every American heart.

We do not deem it necessary to apologize to the readers of The United Service for giving up so much space in the current number to the British Naval Prize Essay of 1880. Captain Fremantle's paper is clearly and vigorously written, and contains much of interest and value to officers of his profession.

SERVICE LITERATURE.

"CAMPAIGNING WITH CROOK," by Captain Charles King, U.S.A., is a neat paper-bound volume of 132 pages, published by the Sentinel Company, of Milwaukee, Wisconsin, giving the incidents of the Big Horn and Yellowstone expedition of 1876. It is graphically written, and is far more interesting than even the higher class of novels. We commend it without hesitation to the notice of professional and lay readers alike.

J. B. LIPPINCOTT & Co. announce for immediate issue "Jackson's Valley Campaign," by William Allan, formerly lieutenant-colonel and chief ordnance officer Second Corps, A.N.V., with full maps of the region and battle-fields by Jed. Hotchkiss, formerly captain topographical engineers in the same corps.

A VERY desirable addition to the library of a naval officer will be the work on "Torpedoes and Torpedo Warfare," by C. W. Sleeman, formerly lieutenant R.N., and late commander Imperial Ottoman Navy. It contains fifty-seven full-page illustrations, and is published by Simpkin, Marshall & Co., of London, and Griffin & Co., of Portsmouth, England.

D. APPLETON & Co. will be the American publishers of "Memoirs of my Exile," by Louis Kossuth, which will be a very interesting contribution to the history of the establishment of the Italian kingdom. It will give the particulars of the secret treaties with the details of the understanding between England, Napoleon, and Count Cavour, and will contain some revelations of importance. The enthusiasm over Kossuth when in America ought to make the work a popular one here.

STUDENTS of the art of war will be glad to know that Mr. John Allyn, of Boston, is about to issue "Maps to Cæsar's Gallic War," by A. von Kampen.

BEFORE another issue of THE UNITED SERVICE it is expected that naval literature will have been enriched by the appearance of two works which will doubtless prove valuable to the profession. We refer to "The War Ships and Navies of the World," by Chief Engineer J. W. King, and "The Navies of the World," by Lieutenant E. W. Very.

ANOTHER history of the Zulu war is in the press (Sampson Low), and has been written by Major Ashe, late of the K. D. G.'s, or King's Dragoon Guards, and the late Captain Wyatt Edgell, of the Seventeenth Lancers. This latter officer was killed at the battle of Ulundi, so it is presumed that the literary share which he contributes to the work will be taken from the very excellent letters which he wrote to the London *Morning Advertiser*, for which he acted as war correspondent.

OUR valued contributor, Captain S. B. Luce, is engaged in making a compilation of naval songs, and, so far as practicable, of the music to which they are habitually sung. Primarily intended as at once a means of entertainment and of incitement for the apprentice-boys of the navy, the volume will, we predict, be very popular with nautical men of every name and grade.